5A.1 Flight Readiness Review (FRR)

International Space Station Program

Agenda

Mission Overview	Bernestine Dickey
GFE Flight Projects Readiness	Cathy Dempsey
Vehicle Readiness	Mike Suffredini
Program Integration Readiness	Mark Geyer
Avionics/Software Readiness	Bill Panter
Payloads Readiness	Ven Feng

ISS-5A.1 Flight Readiness Review (FRR)
Mission Overview
B. Dickey / ISS-5A.1 LPM
2-27-01

Agenda

- ISSP 5A.1 Program Reviews
- Stage Mission Priorities
- Stage Overview
- ICC Manifest
- MPLM Manifest
- MPLM Overview
- Stage Consumables Status
- Configuration Status

ISSP 5A.1 Program Reviews

In **preparation for the 5A.1 Flight Readiness Review (FRR), the ISSP held program reviews that addressed the readiness of hardware, software, facilities, personnel and operations to proceed to launch and on-orbit operations. these reviews consisted of:**

Station Cargo Readiness Review (SCRR)

- Held September 20, 2000
- Addressed status and readiness of manifested hardware / software items and station accommodation hardware (Multipurpose Logistic Module (MPLM, Integrated Cargo Cargo Carrier (ICC), racks, respupply stowage platforms to begin the integration process (both physical and analytical)
- Completed successfully and authorization received to proceed with MPLM and ICC integration.

Launch Package Readiness Review (LPRR)

- Held January 27, 2001
- Addressed the CoFR 1 requirements for the 5A.1 cargo elements (Multi-purpose Logistics Module (MPLM), Integrated Cargo Carrier (ICC), critical spares, Lab Cradle Assembly, Rigid Umbilical, External Stowage Platform), and middeck stowed hardware and their readiness for integration into the orbiter.
- Completed successfully and authorization received to complete payload processing

Stage Operations Readiness Review (SORR)

- Held February 9, 2001
- Addressed CoFR 2 requirements for the launch package, personnel, facilities and operations and their readiness to proceed to launch 5A.1 on 3-08-01.
- No exceptions to proceed

5A.1 Stage Mission Priority Summary

1. Perform checkout of RWS-1, activate and checkout MSS-1, and install, activate and checkout RWS-2
2. Complete 3 Progress M cargo transfer and Undock
3. Dock 4 Progress M1 to the SM aft port and perform cargo and propellant transfer
4. Complete checkout of US Lab electrical power system
5. Activate and checkout Avionics Rack 3
6. Perform Ku-Band checkout
7. Perform Active Thermal Control System checkout
8. Install and checkout the Fluid System Servicer
9. Fill, activate, and checkout Node 1 Thermal Control System
10. Activate and checkout CHeCS rack
11. Perform SM outfitting and resupply with hardware delivered on 3P
12. Perform reboost of ISS as required
13. Perform prepack for Flight 6A
14. Perform checkout of the USOS to RS audio capability
15. Perform checkout of the integrated support systems for payload operations
16. Perform HRF rack checkout

5A.1 Stage Mission Priority Summary

17. Perform Utilization activities – US and Russian
18. Prepare rack locations for racks delivered on Flight 6A
19. Install Medium-Rate Communication Outage Recorder
20. Install CEVIS
21. Disassemble Early Comm Equipment, reconnect power and data lines to the Node 1 Starboard CBM, and checkout CBM
22. Install Docked Audio Interface Unit

Increment Overview

Increment Start: Flt 5A.1 launch (8 March 01)

Increment End: Flt 7A.1 undock (19 July 01)

Increment Duration: 133 days

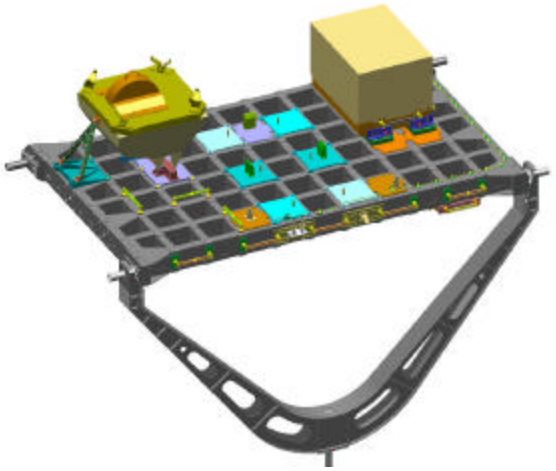
5A.1 Stage Duration: 33 days

Crew:

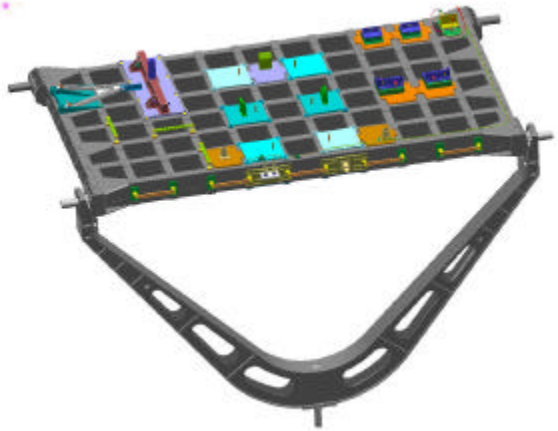
- ISS2-1: Rosaviakosmos/Yury Usachev
- ISS2-2: NASA/James Voss
- ISS2-3: NASA/Susan Helms

ICC Manifest

Fwd



(Ascent)



(Descent)

Integrated Cargo Carrier Cargo Items

- Lab Cradle Assembly (LCA)
- Rigid Umbilical (RU)
- External Stowage Platform (ESP)
- Pump Flow Control Subassembly (PFCS)
- Flight Support Equipment (FSE)

Integrated Cargo Carrier Cargo Items

- Flight Support Equipment (FSE)

MPLM Configuration

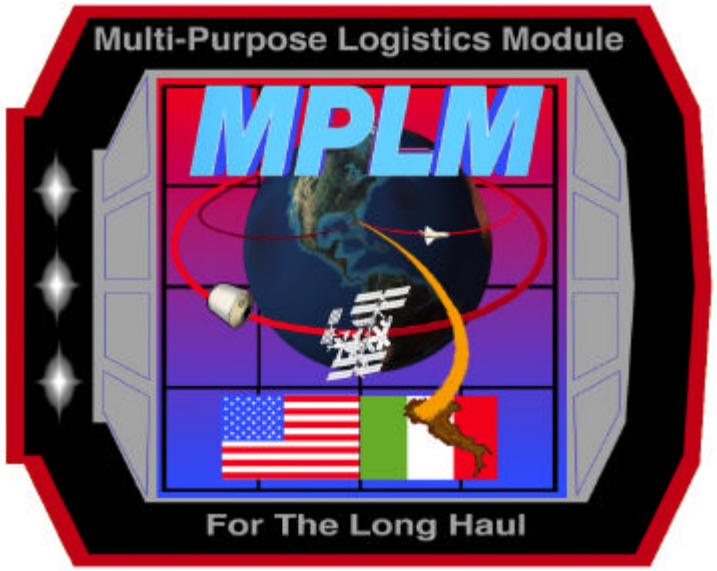
MPLM Cargo Items (Ascent)

- Six U.S. Lab System Racks
  a. Avionics Number 3 (AV-3) Rack
  b. MSS Number 1 (MSS-1) Rack
  c. MSS Number (MSS-2) Rack
  d. DDCU Number 1 (DDCU-1) Rack
  e. DDCU Number 2 (DDCU-2) Rack
  f. CHeCS Resupply Rack
- Human Research Facility (HRF)
- 3 Resupply Stowage Racks (RSRs)
- 4 Resupply Stowage Platforms (RSPs)

MPLM Cargo Items (Descent)

- 3 Resupply Stowage Racks (RSRs)
- 4 Resupply Stowage Platforms (RSPs)

Multipurpose Logistics Module (MPLM) Overview



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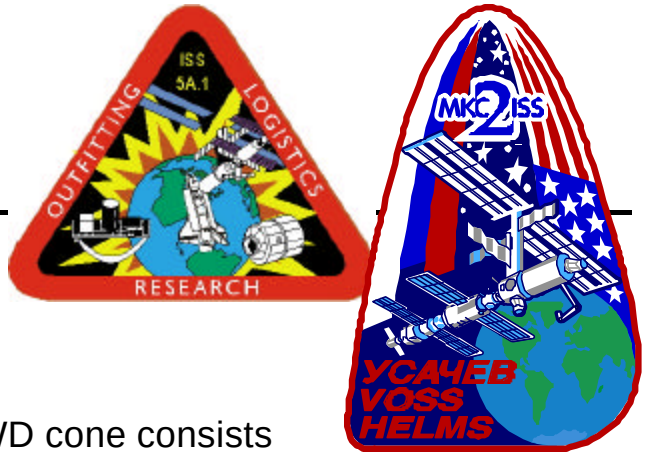
MPLM Physical Description



Flight Module 1, “Leonardo”

Aluminum structure closed at each end with two end cones. The FWD cone consists of a standard ISS Hatch and Passive CBM for crew access. The AFT cone consists of a bolted spherical dome for ground access/loading.

External Architecture
- Primary Structure (3mm min)
- Mechanisms & Equipment
- Meteoroid/Debris Protection System
- Multi-Layer Insulation

Internal Architecture
- Internal Structure
- Environmental Control System
- Avionics Equipment

Payload Configuration
- Passive (no utilities to Payloads)

Diameter
- External, 178 inches (~15 feet)
- Internal, 166 inches (~14 feet)

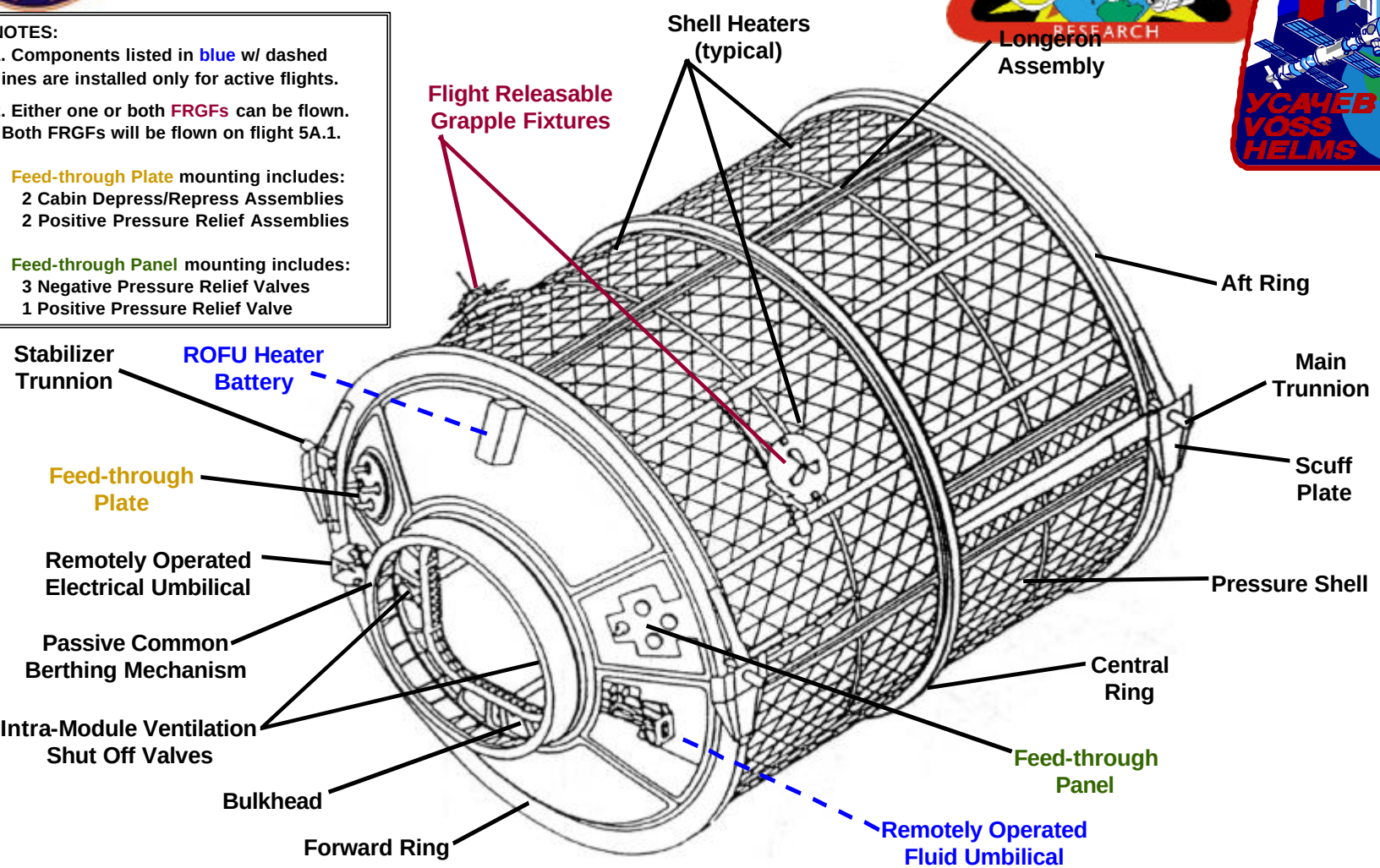
Length - 246 inches (~21 feet)

Weight - 9759.69 lb (~4.9 tons)

Design Life
- 10 Years
- 25 Flights

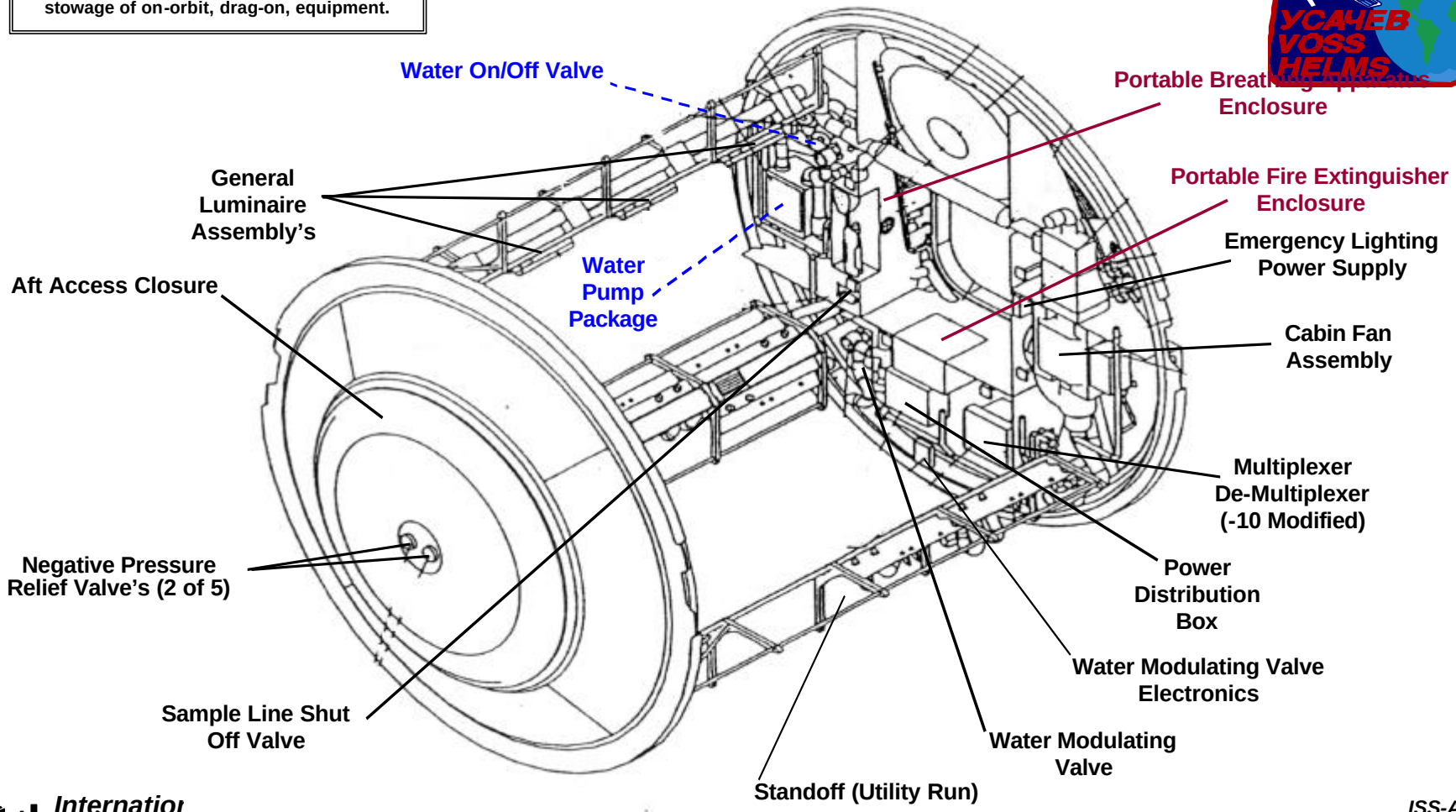
MPLM External Configuration

NOTES:
1. Components listed in blue w/ dashed lines are installed only for active flights.
2. Either one or both FRGFs can be flown. Both FRGFs will be flown on flight 5A.1.
3. Feed-through Plate mounting includes:
   2 Cabin Depress/Repress Assemblies
   2 Positive Pressure Relief Assemblies
4. Feed-through Panel mounting includes:
   3 Negative Pressure Relief Valves
   1 Positive Pressure Relief Valve

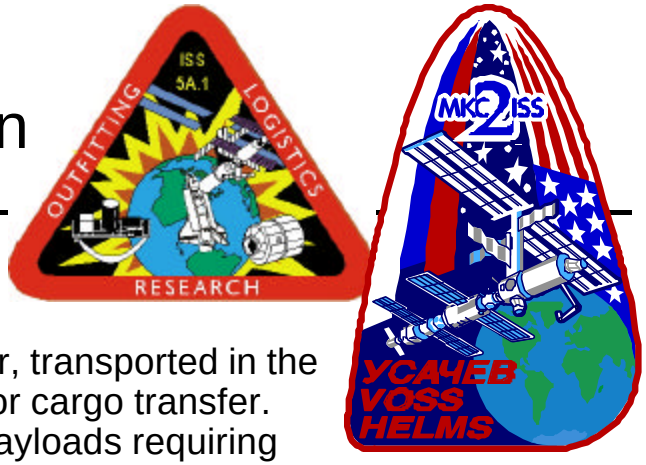


MPLM Internal Configuration

NOTES:
1. Components listed in **blue** w/ dashed lines are installed only for active flights.
2. Enclosures denoted in **burgundy** are for stowage of on-orbit, drag-on, equipment.



MPLM Performance Description



The Multi-Purpose Logistics Module is a pressurized payload carrier, transported in the NSTS cargo bay, and when on-orbit, docked to the Space Station for cargo transfer. MPLM is used to re-supply and to return to ground Space Station payloads requiring a pressurized environment.

Cargo Delivery

- 20,000 lbs. of Payload
- 16 ISS racks (6 ARIS compatible locations)
  - ISPR (16)
  - Express Rack (16)
  - Re-supply/Return Rack (16)
  - Outfitting Rack (16)
  - Refrigerator/Freezer Rack (5 active)

Fault Tolerance

- Mission Success, Zero-Fault Tolerant
- Safety, Per Requirement/Application

Payload Services

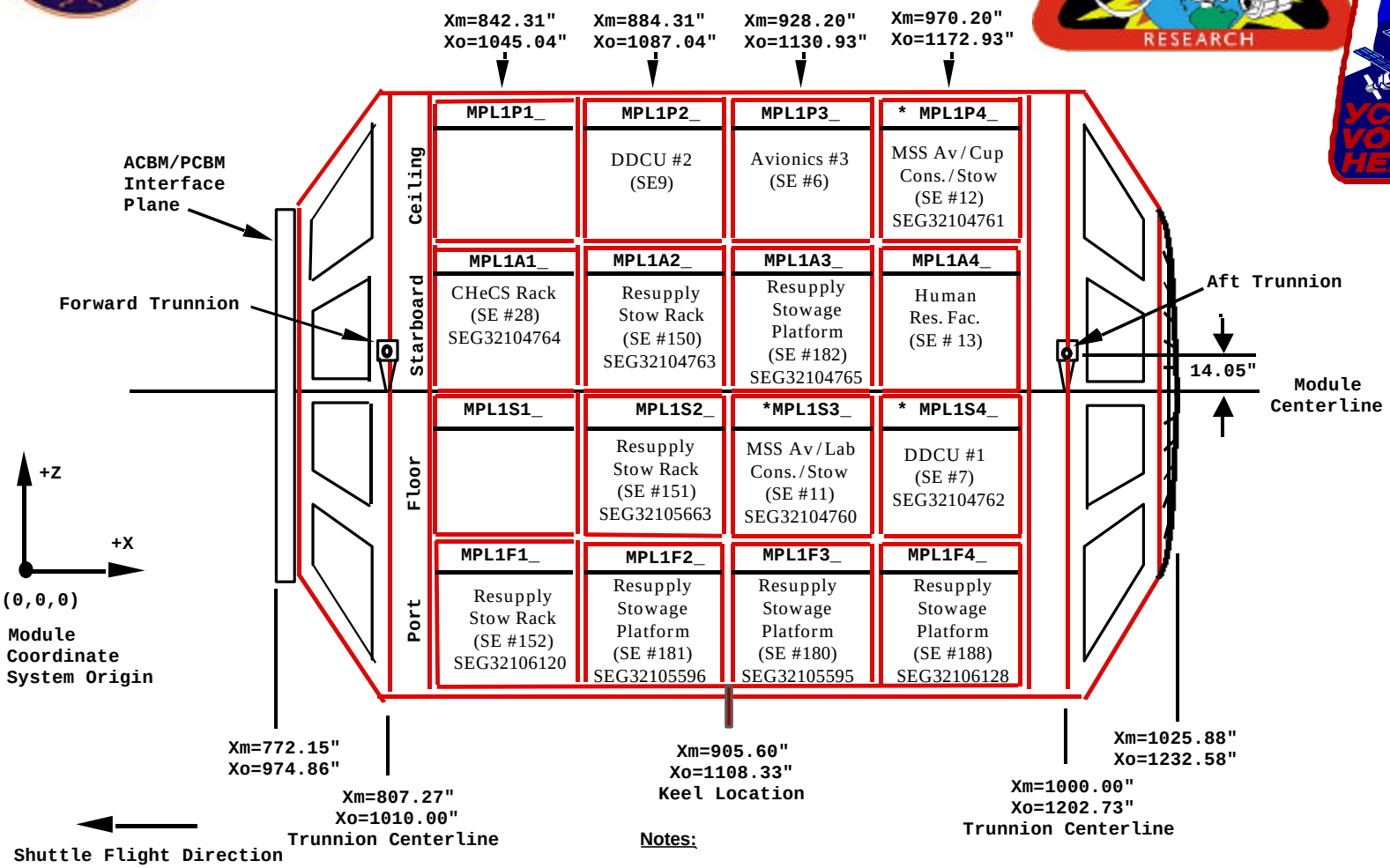
- Pressurized atmosphere
- Temperature controlled

All MPLM payload support capabilities/requirements are described and defined by MSFC in ISS-MPLM-IDD-006. Available at the MSFC/MPLM website, **http://mplm.msfc.nasa.gov.**

5A.1 MPLM Configuration

- **Core module configured for passive flight**
  - Active cooling hardware (WPP, WOV, etc) removed
  - No power provided to rack locations
- **MPLM can receive ground commands while in PLB**
- **MPLM carries 14 racks to ISS and returns with 7 racks**
  - Deliver 6 System Racks and the Human Research Facility to ISS
  - 3 RSRs & 4 RSPs deliver logistics supplies to ISS
  - See next page for layout of racks in MPLM

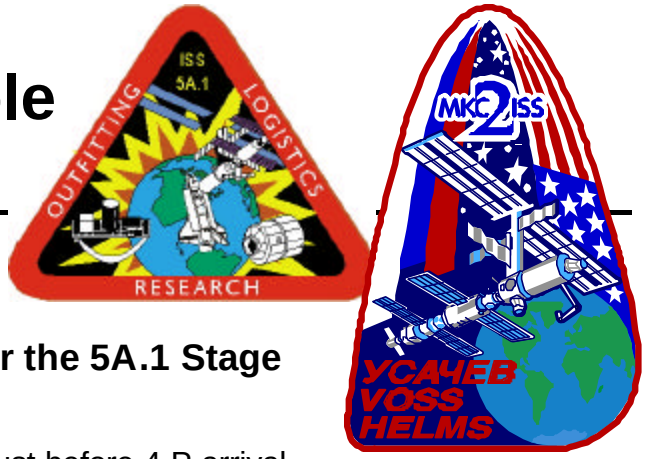
5A.1 Launch Configuration



Notes:

1) Xm - Indicates Module Coordinate System.
2) Xo - Indicates Orbiter Coordinate System.
3) *This drawing is not to scale and should not be considered a dimensionally accurate representation.*

ISS Stage 5A.1 Consumable Status



- **All consumables have been reviewed and are healthy for the 5A.1 Stage**
  - ISS propellant reserve requirement is met
  - Food reserve projected to dip below 45 day reserve to 43 days just before 4 P arrival
  - EDV, KTO, KBO requirements are met
  - Oxygen cassettes are maintained at well ablve the skip cycle throughout the stage for maintenance protection (assumes working electron)
  - LIOH is at the skip cycle requirement until 4P arrival, when more is delivered
  - Crew provisioning requirements are met
  - Water is maintained at well above the skip cycle throughout the stage
  - Details are found in backup charts.

5A.1 Configuration Status

- All 5A.1 approved changes including waivers, deviations, and exceptions, have been identified and incorporated. (except as noted in backup charts).
- The 5A.1 as-built configuration has been reconciled with the as-designed baseline (except as noted in backup charts).
- 5A.1 open work has been identified and will be tracked to closure.

Launch Commit Criteria Statement

- All Stage Readiness Requirements and Stage Launch Commit Criteria have been verified GO
- Applicable Flight Rules are in compliance with the Stage
- There are no 5A.1 Cargo Element Launch Commit Criteria
- Detailed Stage Readiness Requirements / Launch Commit Criteria are provided in the backup

Flight 5A.1 Flight Readiness Review

Special Topic

Treadmill w/ Vibration Isolation System (TVIS) Anomaly Resolution Status

A. Wetterstroem
EA5/CHeCS Subsystem Manager
February 27, 2001

Team Members

OX	Matt Leonard	ISS GFE Hardware Office Lead
	Cathy Dempsey	CHeCS Project Manager
EA5	Jim LeBlanc	EA5 Division Manager
	Al Wetterstroem	CHeCS System Manager
	Jeff Bye	CMS Project Lead
	Javier Lucero	TVIS Engineer/Wyle
	Alan Dickey	CHeCS MER Lead
	Mark Bowman	CHeCS Chief Engineer/Wyle
ES	John McManneman	ES, Structures
SA	Jeff Jones	Lead ISS Flight Surgeon
	Charlie Lundquist	Manager, Exercise Physiology Lab

Agenda

- Background
- Open TVIS Issues
- TVIS Cable Wire Anomaly
- TVIS Belt Slat Anomaly
- Flight 5A.1 Impacts
- Increment Impacts
- Conclusion

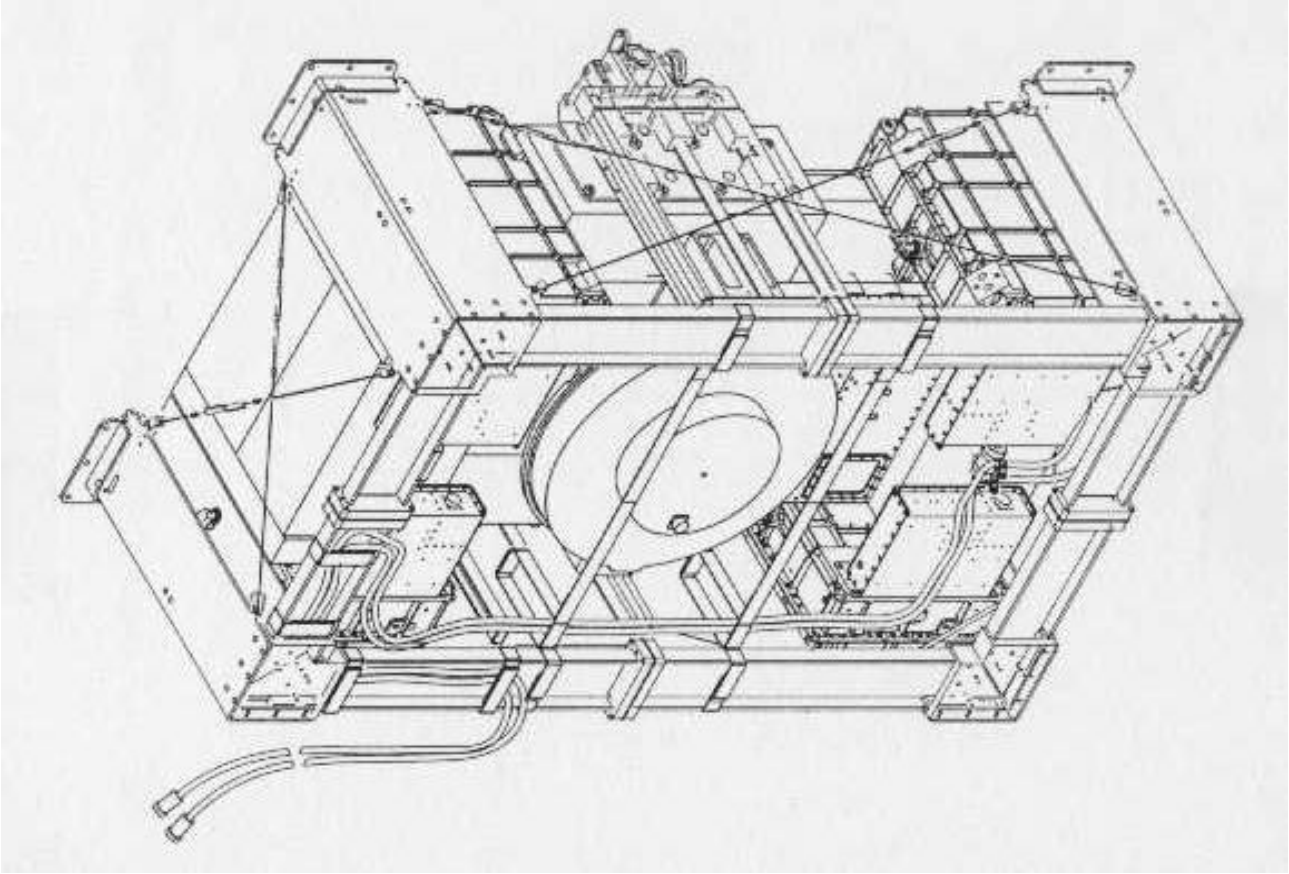
BACKGROUND

Background

- The Treadmill with Vibration Isolation System (TVIS) is one component of the Crew Health Care System (CHeCS) Countermeasures System (CMS) hardware
- CMS also includes the interim Resistive Exercise Device (iRED) and the Cycle Ergometer with Vibration Isolation System (CEVIS)
- TVIS provides a means of aerobic and musculoskeletal exercise onboard ISS while meeting load transmission/isolation requirements for both micro-gravity and structures
- TVIS was flown up on Flight 2A.2A and 2A.2B
- 2A.2B Crew assembled TVIS and Expedition 1 began exercise operations in November 2000

TVIS System in GSE Test Stand

TVIS System (Bottom View)



ISSUES

Open TVIS Issues

#	Issue	Date Opened	Risk Rating	Status
1	PCMCIA Download Problem	11/27/00	Low	Incr 1 crew experienced problems with their PC cards: Engineering still investigating card problems: Problem resolved for Incr. 2
2	Keypad Problems	11/9/00	Low	Crew having difficulty applying actuation force to buttons because Keypad not mounted per procedures
3	TVIS Electrical Potential	11/11/00	Medium	Confirmed ESD stronger than expected given low humidity & known ESD created by exercising crewmember. Crew exercising w/ grounding strap attached to shirt which eliminated ESD; Engineering working long term fix
4	**TVIS Cable Wire Assembly Failure**	**2/13/01**	**High**	**See following charts**
5	**TVIS Damaged Belt Slats**	**2/20/01**	**High**	**See following charts**

TVIS CABLE WIRE ANOMALY

TVIS Cable Wire Anomaly

Problem Description (Identified 2/13/01):

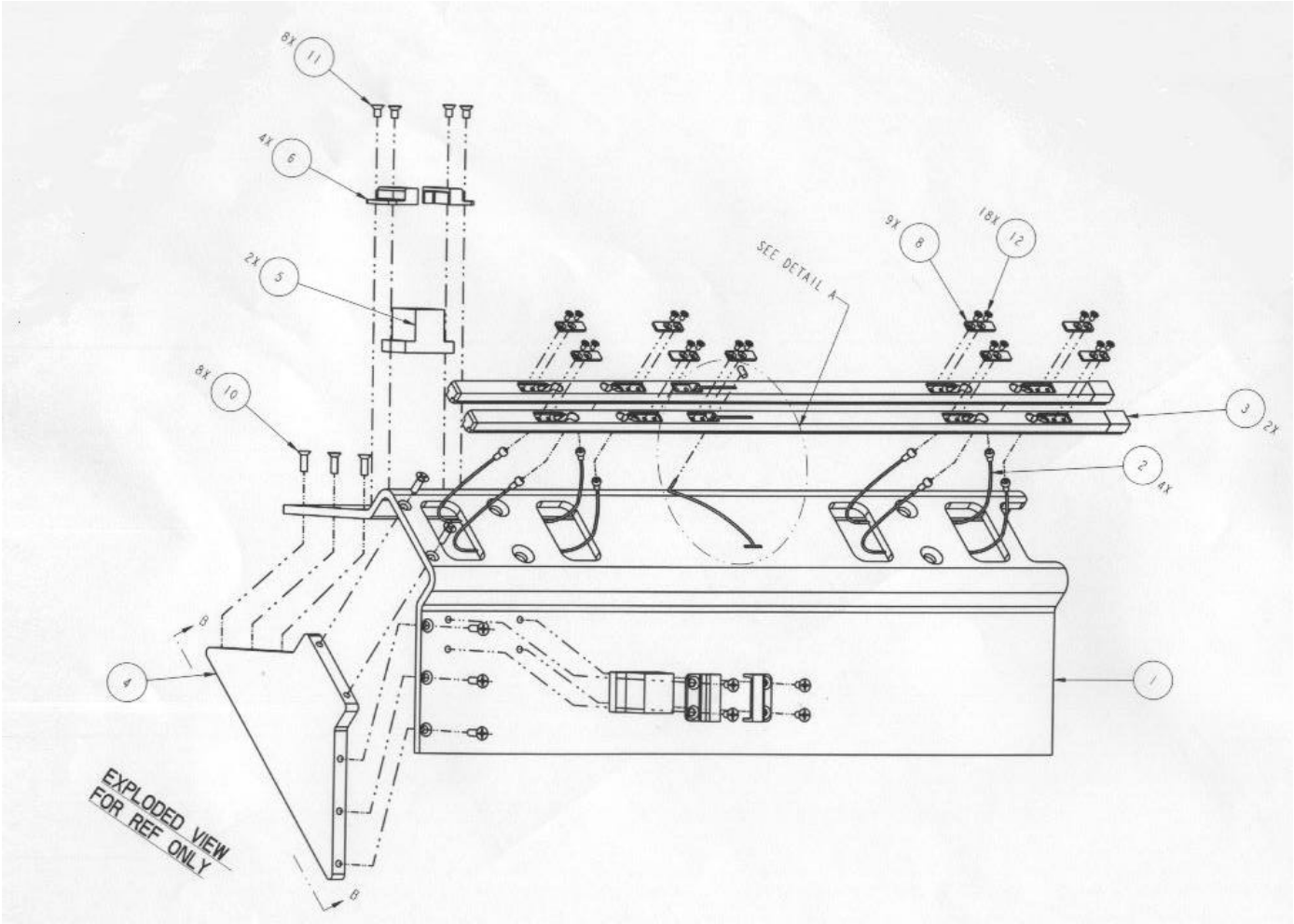
- Kevlar tethers limit +z-axis motion of TVIS & cable wires prevent force transmission to vehicle and return TVIS to neutral position
- All Kevlar tethers and 4 of 8 wire cables on each corner bracket have broken

Root Cause of Failure:

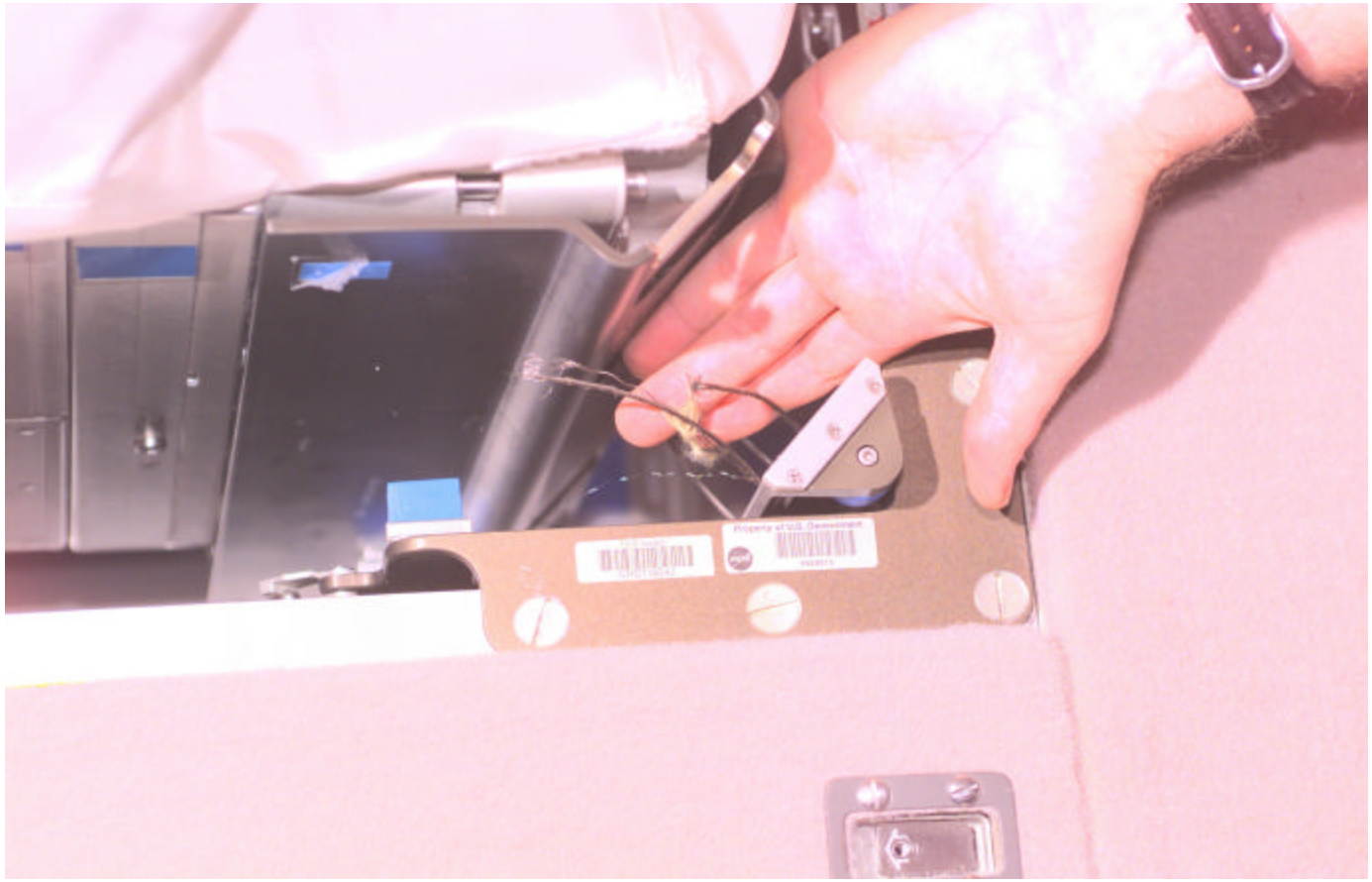
- TVIS is designed for operation while flush with floor, not specified in operational procedures
- Operation of TVIS while in excessive +Z-axis bias caused failure
- After z-axis tethers snapped, wire cables experienced z-axis loading for which they weren't designed, causing fraying and broken cable wires

TVIS Cable Wire Anomaly

TVIS Cable Wire Anomaly



TVIS Cable Wire Anomaly

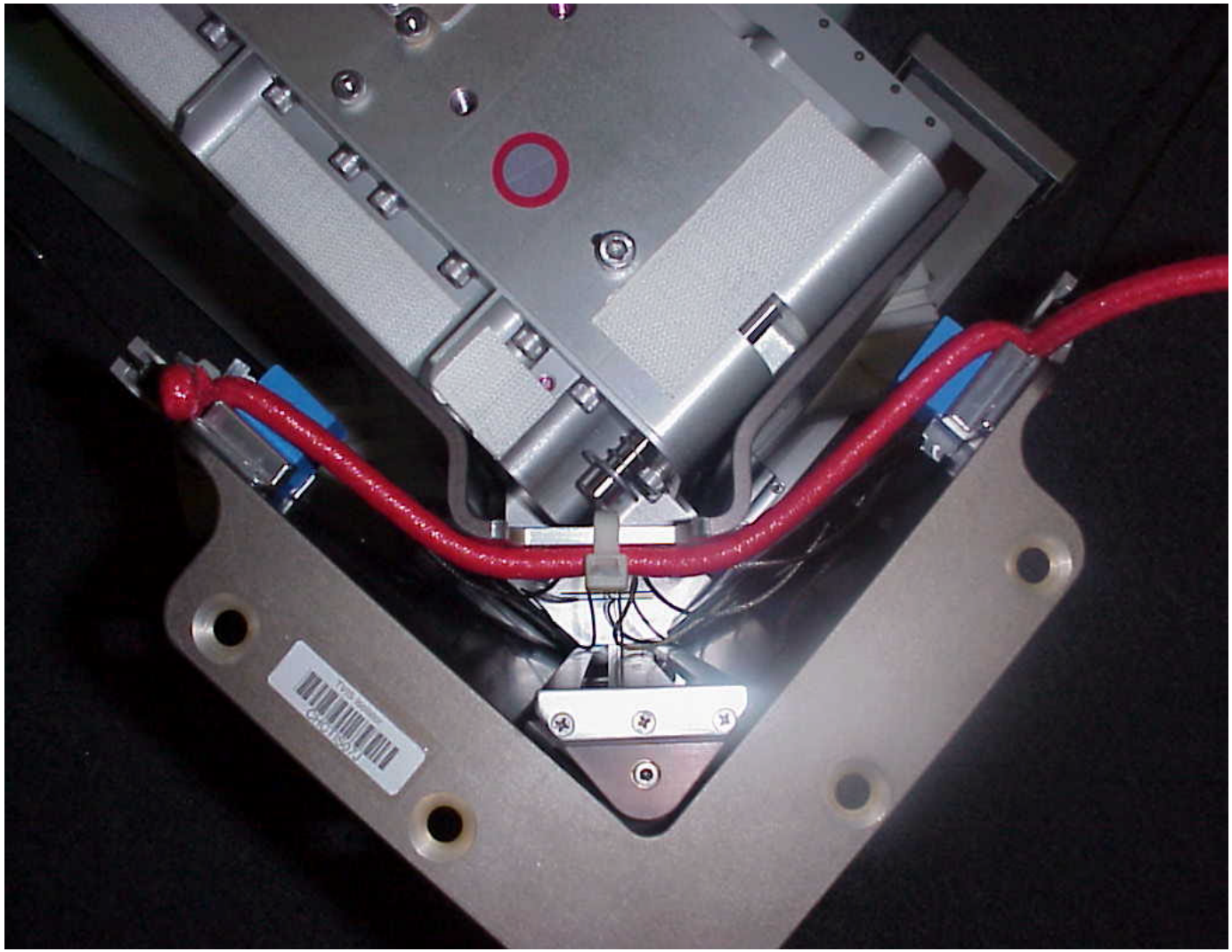


TVIS Cable Wire Anomaly

Failure Response:

- Bungee In-Flight Maintenance (IFM) Procedure to anchor each TVIS corner modified on-orbit
- Requested video of crew running on TVIS to assess TVIS stability
- Requested IWIS or accelerometer data to quantify loads being imparted to ISS structure
  - Control Moment Gyro (CMG) accelerometer data acquired and being evaluated by Engineering
- Bungees reconfigured on 2/26/01
  - Photo documentation of 2/26/01 Bungee configuration required to support ground evaluation

TVIS Cable Wire Anomaly



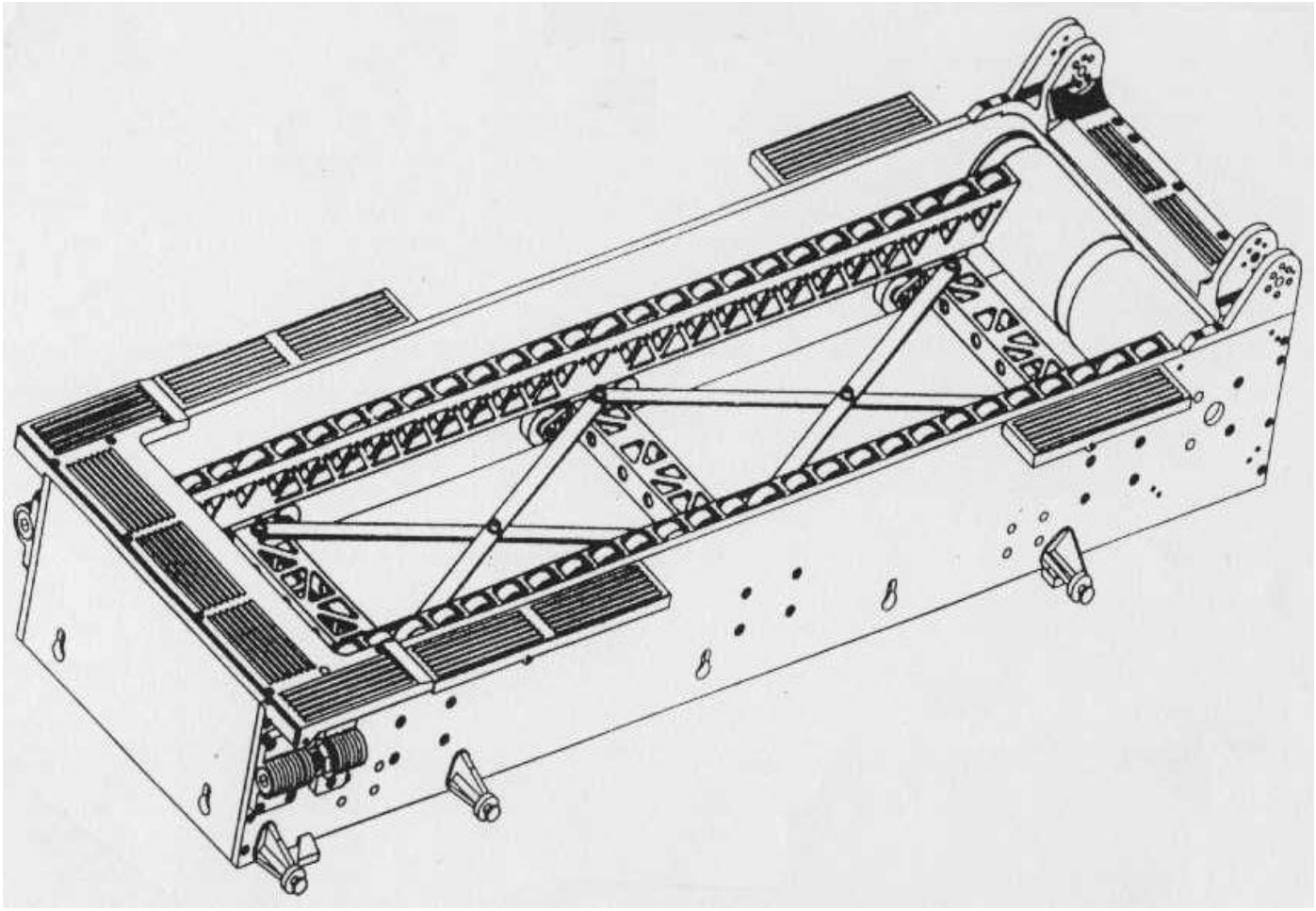
TVIS Cable Wire Anomaly

Forward Plan:

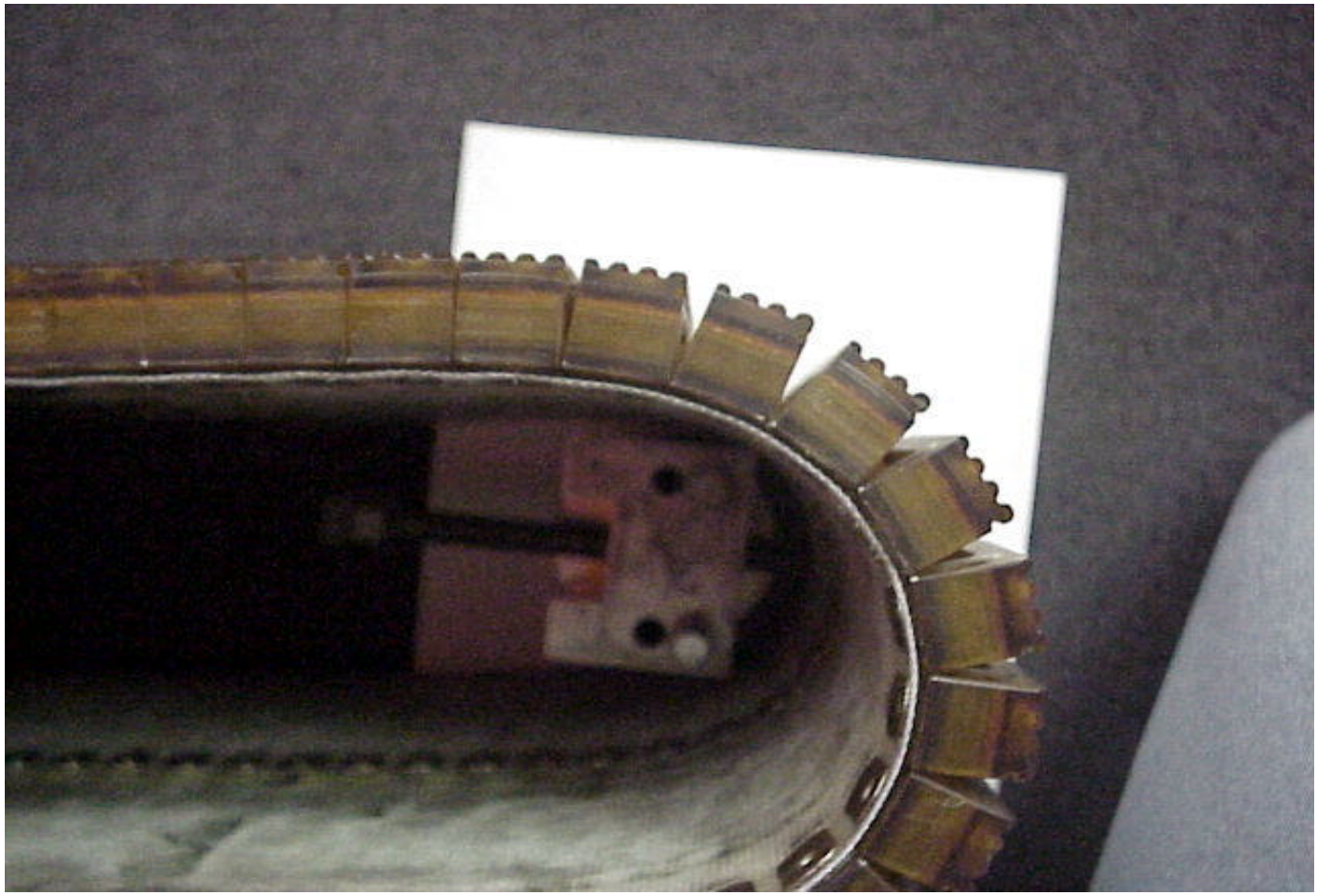
- Rework on-orbit procedures to include TVIS z-axis bias check and correction
- Video and IWIS or accelerometer data required to assess TVIS stability & quantify loading to ISS
  - Engineering recently received lab accelerometer data and is currently evaluating
- Require engineering evaluation of loading data to determine how long TVIS can operate with bungees in place
- ISS loading assessment will determine if interim and/or long term fix is needed
- Engineering assessing options for both interim and long term fixes

TVIS BELT SLAT ANOMALY

TVIS Chassis



TVIS Belt with View of RIV Nuts & Slats



TVIS Belt Slat Anomaly

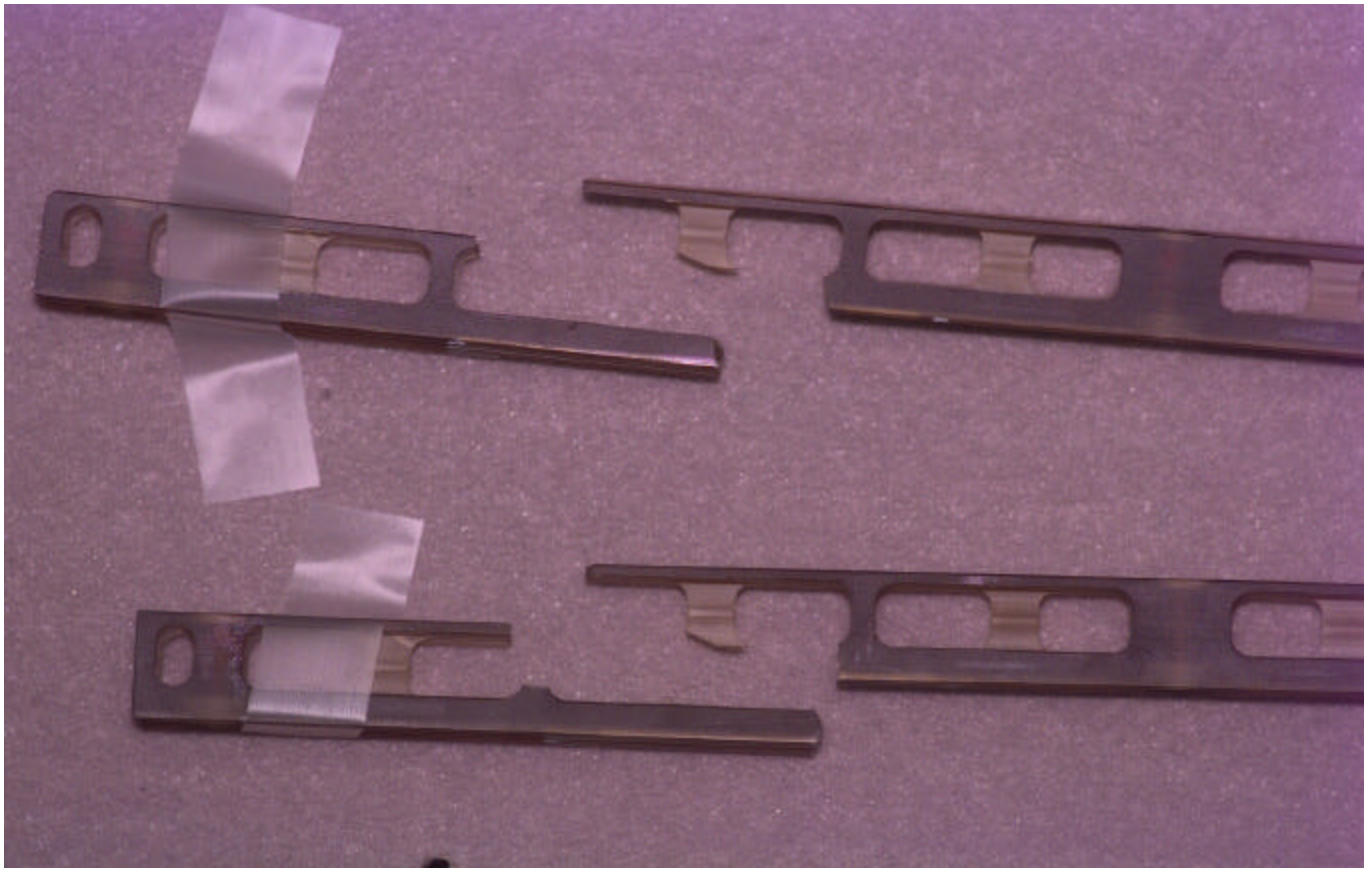
Problem Description (Identified 2/20/01):

- Two TVIS belt slats were broken & “clacking”
- Additional belt slats reported as cracked
- During belt slat Replacement IFM, lost riv-nut within TVIS Chassis

Root Cause of Failure:

- Upon inspection of flight slat inventory, it was determined there were two lots, each with different manufacturers
- One lot was determined to be of superior manufacturing quality
- Slats on-orbit and in flight back-up are from inferior lot
- Stress analysis for TVIS was done using the on-orbit environment only(Zero-G)
- Functional/Acceptance testing was performed in 1-G
- 2 slats from Flight back-up unit inspected which revealed a crack in one of the two slats.

TVIS Belt Slat Anomaly



TVIS Belt Slat Anomaly

Failure Response:

- Upon identification of Belt Slat failure, TVIS ops were terminated (2/21/01)
- Belt Slat Replacement IFM implemented
- Post-IFM, Crew reported additional cracked slats and riv nut problem
- Telecon'd with Crew to understand & characterize slat problem
  - Crew reported quantity of slats broken and/or cracked
  - Clarified condition of the TVIS belt slats and parts
  - Identified difficulties encountered by Crew during Slat Replacement IFM
- Crew reported riv nut missing within TVIS Chassis
- Crew performed TVIS Chassis inspection for riv nut & full inspection of all TVIS Slats
  - Riv-nut was found by crew; Inspection performed & one additional slat replaced

Forward Plan:

- Evaluating on-orbit replacement of failed slats versus replacement of complete chassis on a future flight, permanent solution to be provided by 7A.1
- CHeCS Team preparing back-up flight TVIS Chassis for launch on Flight 6A

Impacts & Conclusions

Flight 5A.1 Impacts

TVIS Cable Wire Anomaly:

- Four cable wires still intact at each TVIS corner
- Structural loading analysis of bungee configuration needed to confirm if additional reconfiguration is necessary

TVIS Belt Slat Anomaly:

- Flying spare hardware items up on Flight 5A.1
  - Additional Slats/screws/washers/riv-nuts/bungees/tie wraps
  - Required to support additional Belt Slat replacements
- Hardware items being accommodated within 5A.1 middeck w/o impact
- Requesting return of all broken/cracked slats removed from TVIS belt to support failure analysis and redesign efforts

Increment Impacts

- Crew allowed to use TVIS in Normal Mode for remainder of Increment 1
  - Potential impact to crew time to support additional TVIS maintenance tasks
- Pursuing Increment 2 training for TVIS disassembly/assembly operations required for chassis swap out and Belt Slat replacement
- Impacts of in-operable TVIS:
  - Medical Operations developing contingency exercise options to maintain crew health
  - May result in additional cycling on other exercise devices
    - U.S. Cycle Ergometer being delivered on Flight 5A.1
    - Russian Cycle repair parts being delivered on Progress 4P
    - iRED operational in Node

Conclusion

- TVIS is operational with minimal constraints
  - Spare parts are being flown on 5A.1
  - TVIS status being accessed daily
- TVIS anomaly resolution plans have been implemented
- Forward work plans are in place to recommend design modifications for current anomalies and investigating manifest opportunities (6A, 7A.1)
- Contingency exercise options are in work if TVIS operation is lost
- JSC Engineering Directorate, Space & Life Sciences Directorate and ISS GFE Flight Projects Office have no constraints for launch of Flight 5A.1 and Increment 2 Crew given known TVIS anomalies

Vehicle Office

ISS
Vehicle Office
Flight Readiness
Review

02/27/01

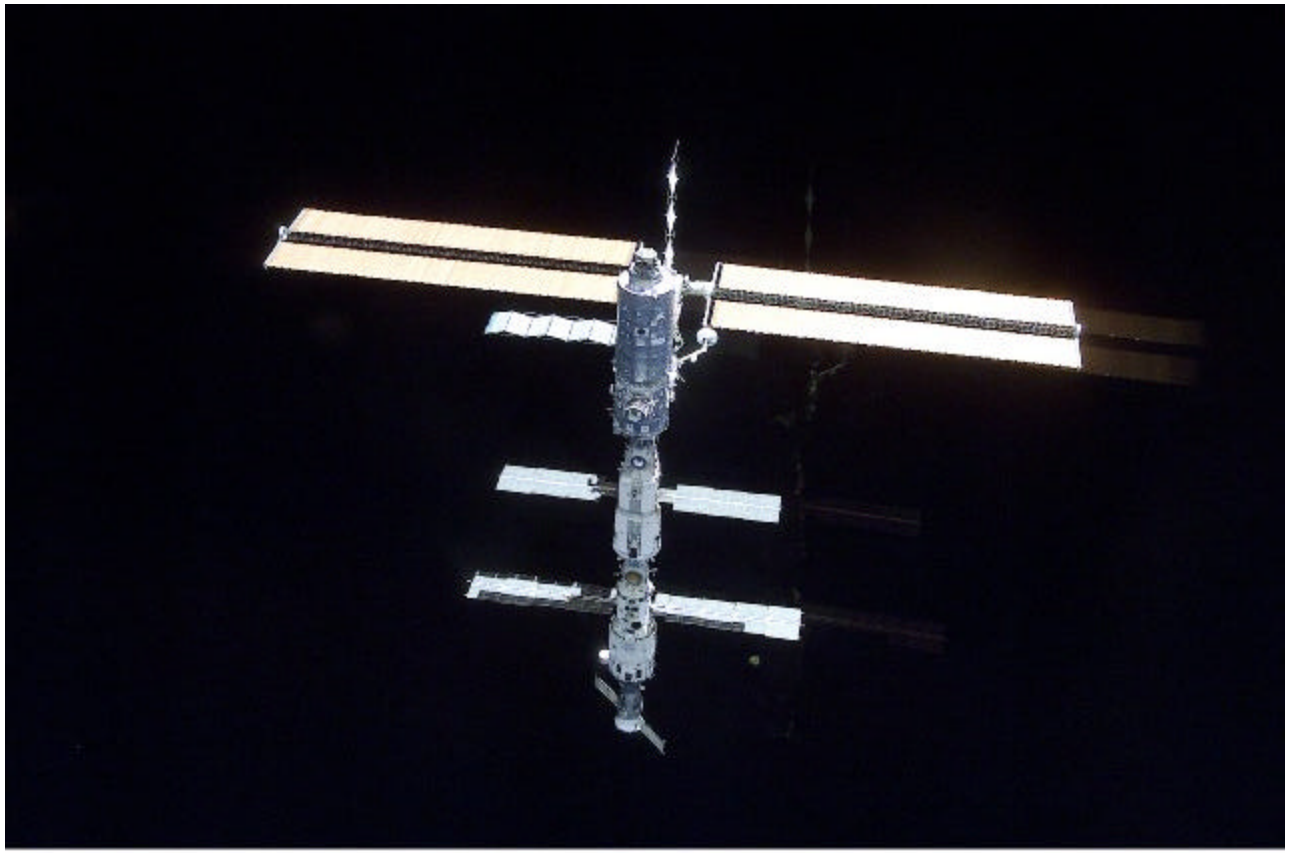
AGENDA

5A.1	ON ORBIT STATUS	WALKER
	MPLM LTA Heaters	
5A.1	OPEN PAPER STATUS	PREJEAN

SPECIAL TOPICS

GFCI	TRIPPING – PRACA 2431	GHOLDSTON

On orbit view from 5A Fly Around



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Current On-Orbit Status

- C&DH
  - All Station MDMs operating nominally
    - Node – N1-2 primary, N1-2 secondary
    - Photovoltaic Control Unit (PVCU) – 4B primary, 2B backup
    - FGB – 2 on, 1 off
    - SM – Loaded with version 5.0 s/w
      - SMCCs – 2 of 3 in redundant set
      - SMTCs all in redundant set
    - Lab
      - C&C 1 primary, C&C 2 backup, C&C 3 off
      - INT Sys 2 primary, INT Sys 1 off
      - Lab Aft (LA) 1, 2, 3 on
      - Power Mgmt Controller Unit (PMCU) 1 on, PMCU 2 off
      - GNC 1 primary, GNC 2 backup
      - Payload 1 off

Current On-Orbit Status
(continued)

- C&DH (continued) Rapid Depress Alarms
  - Had rapid depress false alarms six times due to SM DDI sensors
    - Two of the six caused SM isolation steps to be initiated.
  - Current SM rapid depress C&W alarm status
    - SM leak detection algorithm configured to use MDD pressure sensor
    - Will not reconfigure to DDIs or US Pressure Control Assembly (PCA) until root cause understood
    - If PCA detects a depressurization event, US s/w will initiate isolation steps.
- Unexpected C&W tones
  - ISS crew has reported receiving C&W tones at 6:00 GMT
    - No associated data on the ground
    - Working with the Russians to understand

Current On-Orbit Status
(continued)

- C&DH (continued)
  - ASN (Russian Glonass receiver) not activated
    - Results in “bad” time data quality flag to be sent to USOS
    - Cannot automatically perform a synchronization of time
      - Ops workarounds in place to keep time in sync
  - RS attitude data quality flag defaults were set to go to “degrad after a BINS correction in the version 5.0 s/w.
    - S-band operations affected
      - Auto pointing on High Gain Antenna lost
    - Defaults reset to 100 hours
    - S-band ops now nominal

Current On-Orbit Status
(continued)

- C&T
  - Early communications system deactivated
  - S-band high/low data rate operating nominally
  - SM Regul System operating nominally
  - FGB Komparus System not operating
    - Can perform required commanding to FGB either via the SM Regul System or the S-band system
    - Nominal FGB plan was to not repair this system if it ever failed post SM docking
  - Have experienced some comm problems post 5A
    - Hearing an echo when the ISS crew talks to the ground from the SM
    - Temporary loss of S-band forward link audio channels
    - Have teams in place to resolve these issues

Current On-Orbit Status
(continued)

- ECLS
  - SM Vozdukh operating on 2 of 3 CO2 removal beds
    - CO2 removal capability nominal
    - Spare Vozdukh and fans transferred on 5A
  - Elektron on
  - Only one of two air conditioners (CKB) operational
    - Spare power supply required to get CKB1 operational
    - Power supply transferred on 5A
  - RS ECLS repairs to be scheduled
  - All Lab ECLS systems activated and checked out except for the CDRA
    - Nominally CDRA is a backup to the Vozdukh

Current On-Orbit Status
(continued)

- ECLS (continued)
  - CDRA Anomaly
    - CDRA startup was stopped due to 2-stage air save pump failing
      - Telemetry indicated zero pump speed: all other parameters were normal during active BIT
    - Manual pump override command was executed and failed to rotate pump
      - Telemetry signature was the same
  - On-orbit CO2 removal functionality
    - Vozdukh operational and providing CO2 removal capability
      - Spare parts available, if needed
    - 14 days of LiOH available

Current On-Orbit Status
(continued)

- ECLS (continued)
  - CDRA Anomaly (continued)
    - Analysis of the fault tree indicated three possible hardware failures
      - Failure could be locked pump rotor or pump, controller, or cable wiring continuity problem
    - Spare pump and cable were manifested on 5A.1
    - Forward Work
      - Develop PPL's necessary to attempt to free a locked pump rotor
      - Troubleshoot wiring continuity problems during 5A.1 stage
      - Investigate operation of CDRA without the air save pump
        - Incur significant gas loss (approx 2.5 lbs/day)
        - Requires testing of operation and development of PPL's

Current On-Orbit Status
(continued)

- ECLS (continued)
  - Lab Vent Relief Valve Anomaly
  - On 5A mission, PMA2 venting imparted a noticeable roll moment to ISS
    - Venting of PMA3, MPLM vestibule, and PMA2 are required during 5A.1 mission
      - PMA3 will be vented pre-docking
      - MPLM vestibule will be vented during docked operations
        - Mated stack analysis in work (small volume /little impact)
      - PMA2 will be vented post-undock
  - Orbiter Water Dumps
    - ISS contamination concerns mitigated by the following actions
      - Solar arrays will be feathered to minimize contamination
      - Telemetry on dump performance will be monitored
      - Video of nozzle vent direction during first vent is highly desirable
      - Lowering of Lab LTL temperature is highly desirable to minimize condensate collection in the Orbiter
    - Orbiter waste dumps are acceptable from an ISS contamination viewpoint with these constraints

Current On-Orbit Status
(continued)

- ECLS (continued)
  - Bar-quat wipes are currently manifested in the MPLM as part of the disinfection kit
    - 5A.1 is the initial flight for this hardware
  - Wipes are impregnated with benzalkonium chloride
    - Recent concerns with materials compatibility have been identified with chloride in contact with stainless steel, aluminum, anodized aluminum, and paint
    - Testing of materials compatibility of Bar-quat wipes with metals of concern in currently ongoing
      - Preliminary results expected March 2
      - Final results expected March 30
  - If materials incompatibility is found, Bar-quat wipes will be returned to ground
    - Decision on whether to yellow tag the wipes will be made on March 2

Current On-Orbit Status
(continued)

- EPS
  - FGB EPS working nominally
    - 6 of 6 batteries operational
  - SM EPS working nominally
    - 8 of 8 batteries operational
  - P6 power channels 2B and 4B operating nominally
    - Solar arrays have successfully operated in directed position and auto tracking mode
    - Directed position or locked mode used for shuttle docking & undocking maneuvers, or prop conservation
    - Excellent correlation between actual power generation and predictions

Current On-Orbit Status
(continued)

- EPS (continued)
  - Node 1 Starboard UOP failed
    - Returned on 5A
    - Node 1 Port UOP experienced GFCI Trips (Special Topic)
  - Node 1 RPCM N1-3B-A “health” flag
    - Data dump confirmed bit flip in unused portion of memory
    - No impact to operations
  - DDCU health status flag (external unit on P6)
    - Detected bit error in an unused portion of EEPROM
    - No impact to DDCU operations
      - Have lost s/w overvoltage protection
      - Still have firmware overvoltage protection
    - Decision is to proceed with refresh procedure
      - Software patch for Photovoltaic Control Application (PVCA) required
        - Patch previously delivered - awaiting upload
    - Refresh procedure for DDCU verified in SPEL
      - MOD commands/procedures to be completed
    - Refresh will be scheduled as soon as priority permits

Current On-Orbit Status
(continued)

- TCS
  - Early External Active Thermal Control System (EEATCS) operating within specs
    - Radiator outlet temperatures higher than predicted
      - Pre-5A temperatures ~40-50 deg C higher
      - Post-5A temperatures ~25 deg C higher
    - Starboard radiator deployed on 5A
    - Heat rejection capability nominal
  - ITCS operating nominally
- S&M
  - 3 of 4 Beta Gimble Assembly (BGA) latching mechanisms locked on each BGA
    - Strength analysis shows 3 of 4 acceptable for near term

Current On-Orbit Status
(continued)

- GN&C
  - CMGs activated on 5A
    - CMG 2 experienced a loss of comm with the GNC MDM
      - Brought back in operating set
    - Have seen occasional “current spikes” on CMG 2
      - Would expect current spikes during active desaturization ops
      - Have seen during “quiescent” operations
      - Team is still assessing
  - Operations nominal
- EV&CS
  - TVIS has experienced problems
  - Short term fix in place
    - Crew has installed bungees to constrain TVIS motion
  - Long term fix in work
    - To be discussed by the ISS GFE office
- Propulsion systems nominal

Recent Events

- C&DH
  - C&C 2 went offline briefly last Friday
    - Successfully rebooted and operating as backup
  - INT Sys 2 reported a bus exception error
    - May have been caused by too much activity at one time
- ECLSS
  - PCA safed itself on Saturday
  - Occurred during crew reentry post Soyuz relocation
- EPS
  - DDCU 2B had a second bit flip on Friday
    - DDCU continues to operate nominally
    - Testing for the refresh expected to have been completed on Monday
    - Refresh expected to occur Tuesday morning
  - RPCM N14B-C “health” flag on Saturday
    - RPCM is operating nominally
    - Have refreshed this RPCM on orbit before
    - Expect to refresh again as soon as procedure can be scheduled

All anomalies investigated by Sub-System Teams to the extent that they are no constraint to flight

Detailed investigation continues

Vehicle Office

5A.1 FRR Special Topic
MPLM Launch-to-Activation (LTA) Heaters

Passive Thermal Control System Team

February 27, 2001

Jay Leggett

281-483-6458

Special Topic
MPLM LTA Heaters

- Observations
  - During 5A LTA the US Lab LTA heaters operated at 100% causing the Lab to reach temperatures of approximately 120°F (DDCU baseplate)
    - One APCU was cycled prior to removing Lab from PLB
    - LTA heaters connected to that APCU did not turn back on

- Discussion
  - US LAB

    Solid state
    - Thermostat (electronic components switch heaters on/off)
      - Set points (on: 68°F, off: 75°F)
    - 2 Sensors per thermostat
  - APCU provided power (120V)
  - MPLM
    - Mechanical
      - Bimetallic thermostat (no internal electronic parts)
        - Set points (on: 81°F, off: 95°F)
        - Contacts are thermally and electrically isolated
    - Power provided through payload bus not APCU
      - 28 Volt

Special Topic
MPLM LTA Heaters
(continued)

- Risk Assessment for 5A.1: Low

  Thermal Math Modeling techniques are good

  Mechanical thermostats are proven hardware

  - Plan is to manually operate LTA heaters via cabin switches
    - Prevent PPRV operations
    - Plan was determined through analysis
  - Monitor temperature and pressure continuously

Special Topic
MPLM LTA Heaters
(continued)

- Acceptable for flight: Yes
  - US Lab versus MPLM
    - Different type of heater system
      - Solid state .vs. Mechanical (bi-metallic)
    - APCU does not feed power to MPLM LTA heaters
      - 28Volt to MPLM versus 120Volt through the APCU for the US Lab
    - Lab and MPLM have common heater elements
      - Industry standard
  - MPLM LTA heater system has no common parts with the US Lab LTA heater system (except for heater elements)
  - MPLM LTA heater plan is to manually cycle LTA heaters preventing any high temperature problems
  - Have temperature measurements of the MPLM

Vehicle Office

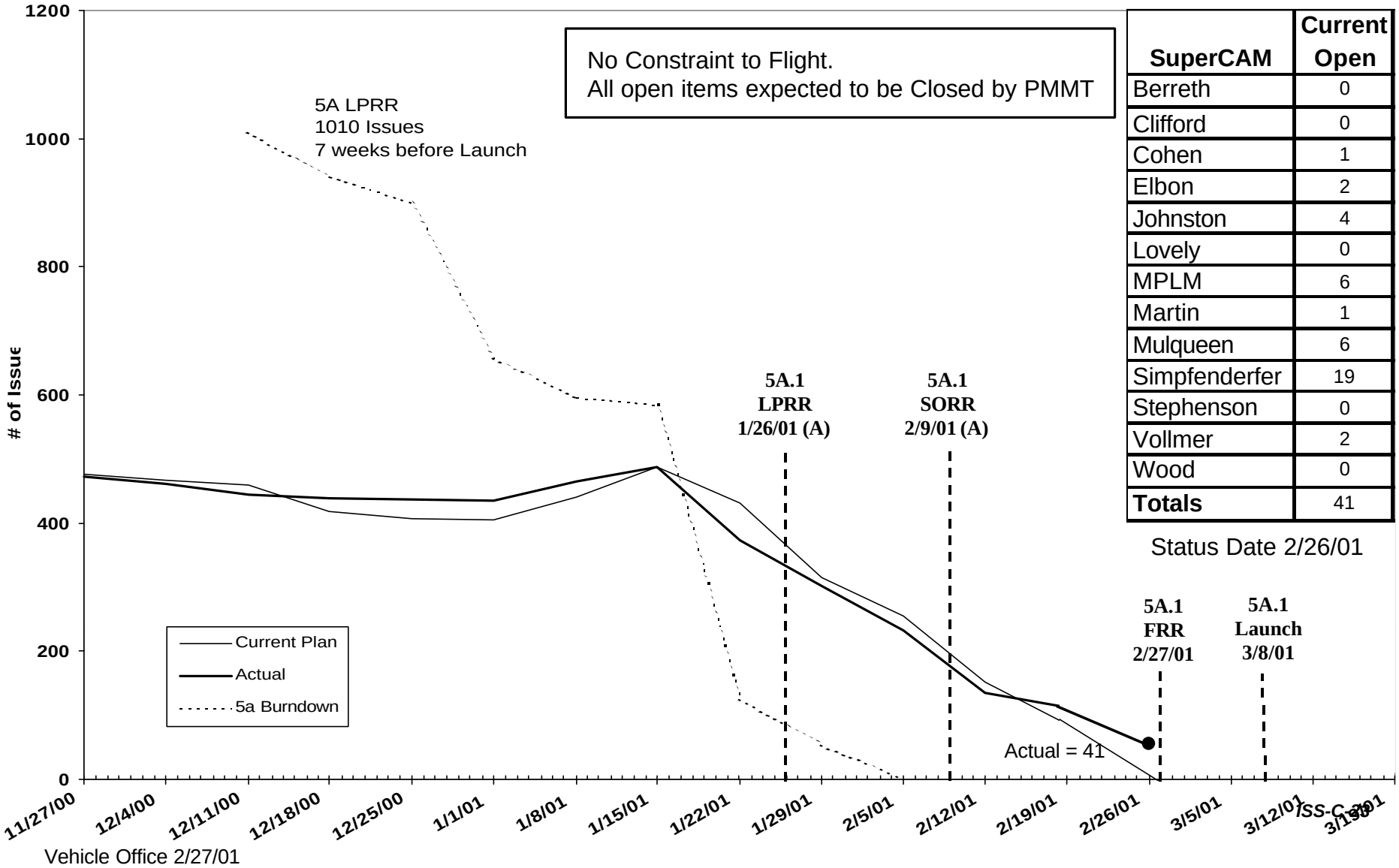
5A.1 Vehicle Flight Readiness Review

Steve Prejean

Updated Charts available on 2/27/01

Updated Verbally 27Feb01

Flight 5A.1
Open Paper Burndown



SuperCAM	Current Open
Berreth	0
Clifford	0
Cohen	1
Elbon	2
Johnston	4
Lovely	0
MPLM	6
Martin	1
Mulqueen	6
Simpfenderfer	19
Stephenson	0
Vollmer	2
Wood	0
Totals	41

Status Date 2/26/01

Vehicle Office 2/27/01

Vehicle Office

5A.1 FRR Special Topic
GFCI tripping - PRACA 2431

Electric Power Team

Ed Gholdston
818-586-2128

Special Topic
GFCI Issue - PRACA 2431

- Observations
  - During 4A operations, Ground Fault Circuit Interrupter (GFCI) tripped in Node 1 while SSC-3 and FPP NCU were being powered from UOP-2.
    - Low voltage leakage currents from the laptop were coupling into data line shields creating a sneak circuit and tripping the GFCI
- Discussion
  - PRACA 2431 assigned against Tertiary EPS distribution system, to ensure an electrically compatible plug-in plan
  - Cause of the 4A trip was a shielded data cable between FPP NCU and SSC-3 laptop adding an additional sneak path for leakage currents, resulting in an “ac” GFCI trip.
    - Laptop computer was granted exception to Grounding and Bonding requirements. Significance of leakage currents with ground sneak paths not recognized at time exception was granted.
  - General issue of leakage current for all UOP loads now being addressed.
  - SPRT is in place to address three major areas:
    - Testing or analysis of Plug in Plan configurations for 5A and beyond
      - Complete through 5A.1
    - Requirements for Shock Hazards, Shielding, Bonding, and Grounding under review
    - Modifications to equipment if determined necessary.

- **No shock hazard to crew**
- **No system level requirements are being violated**

Special Topic
GFCI Issue - PRACA 2431
(continued)

- Risk Assessment for stage 5A.1: Low
  - Work around Plug-in Plan for Node-1 has been implemented using Ku 120/28v power supply for SSC-3 and FPP NCU operations.
  - All critical 5A and 5A.1 configurations using laptop have been tested.
    - Grounding adapter between laptop chassis and cable shield developed and launched on 5A which reduces noise and leakage levels significantly.
  - Some non-critical configurations still require work-arounds.
    - MACE (data storage device, already on orbit) causes GFCI trip when any device on circuit touches ISS structure (creating a sneak path). (Even in stand-alone mode - its leakage current is very near the dc GFCI trip level)
    - On-orbit operational constraint chit developed to keep MACE physically isolated from structure, to minimize possibility of trip, and to allow crew procedures to be transferred and displayed
    - CHIT provided to MOD requesting MACE to be checked out on-orbit prior to 5A.1 to verify that isolation of chassis allows proper operation

Special Topic
GFCI Issue - PRACA 2431
(continued)

- **New UOP Hardware Configurations for 5A.1 - Test and Analysis Status**
  - Human Research Facility (HRF) - Cleared; Uses proven Ku Power Supply
  - Fluid Service System - Cleared for planned on-orbit test (not used until 7A)
  - Ku Forward Link - Cleared by test in SPEL
  - Vacuum Cleaner - Cleared by test in SPEL
  - BP / ECG & CEVIS (CHeCS) - Cleared by analysis; Very tight leakage requirement imposed on medical equipment. 28 volt back-up options
  - EarthKAM - Low criticality load already on orbit; On-orbit test planned prior to 5A.1 (critical loads not to be connected on the same UOP until cleared)
  - Robotic Work Station (needed for 6A)
    - UOP tripped under some conditions at recent KSC test
    - Further ground and on-orbit tests needed (stage 5A.1) to determine details on UOP bypass, hardware mod, etc.
    - To minimize possible UOP trip during stage 5A.1 testing, the LCDM should be kept electrically isolated from structure.

Robotic Workstation Milestones

Options	Key Milestones	Option 1 or 2 decision point
1. Work with existing UOPs - Expansion chassis option - Two UOP option Will be worked during 5A.1 on-orbit testing	- Test hardware at SPEL with expansion chassis: 16 Mar - Evaluate total leakage currents: 19 Mar	20 Mar
2. Guaranteed Fix (3 sub-options) (avoid GFCI)(direct connection to RPC) - Existing bypass cable - New bypass cable - Modified UOP (disabled ac & dc GFCI) For 6A launch. Manifest request in work	- Determine best sub-option: 26 Feb - Finalize Design (including grounding strap): 2 Mar - Measure the voltage threat at DCP at KSC: 12 Mar - Fabricate, test, Qual complete: 30 Mar - Ready for 6A launch by: 9 Apr	20 Mar
3. RWS Hardware Modifications	- Long-term option beyond 6A	

Special Topic
GFCI Issue - PRACA 2431
(continued)

- Status
  - Cause of leakage current GFCI tripping is understood
    - Grounding adaptor developed to reduce laptop leakage currents (14 launched on 5A)
  - Configurations to power Laptop from Ku Power Supply have also been certified as a workaround for use in Node-1
  - CHIT approved to relocate unused Lab UOP into Node-1 to increase number of outlets
  - All 5A.1 critical configurations requiring PCS have been verified
    - Constraints and workarounds required for MACE (Long-term hardware fix is in work)
  - Long term resolution plan in place
    - Test criteria established
    - Leakage and grounding requirements are established in program documents: to be imposed on all new loads
- Acceptable for flight: Yes
  - No 5A.1 critical functions using laptop cause GFCI trip.
  - Operational workarounds exist for MACE configurations.
  - Robotic Workstation cleared for testing on 5A.1 (with LCDM isolation constraint)
  - All other 5A.1 configurations cleared for use

Program Integration Status

February 27, 2001

Mark Geyer
International Space Station Program Office
Program Integration Office / OM
System/Segment Integration
(281) 244-0904

Program Integration

- **Acoustics Plan** **- Mark Geyer**
- **Robotics Initial Operations Capability** **- Skip Hatfield**

Acoustics Plan

February 27, 2001

Mark Geyer
International Space Station Program Office
Program Integration Office / OM
System/Segment Integration
(281) 244-0904

Rationale for Increment 2

- **Though SM acoustics modifications were not implemented in increment 1, Acoustics environment for Increment 2 is not a constraint to launch**

1) Current acoustics environment

Service Module

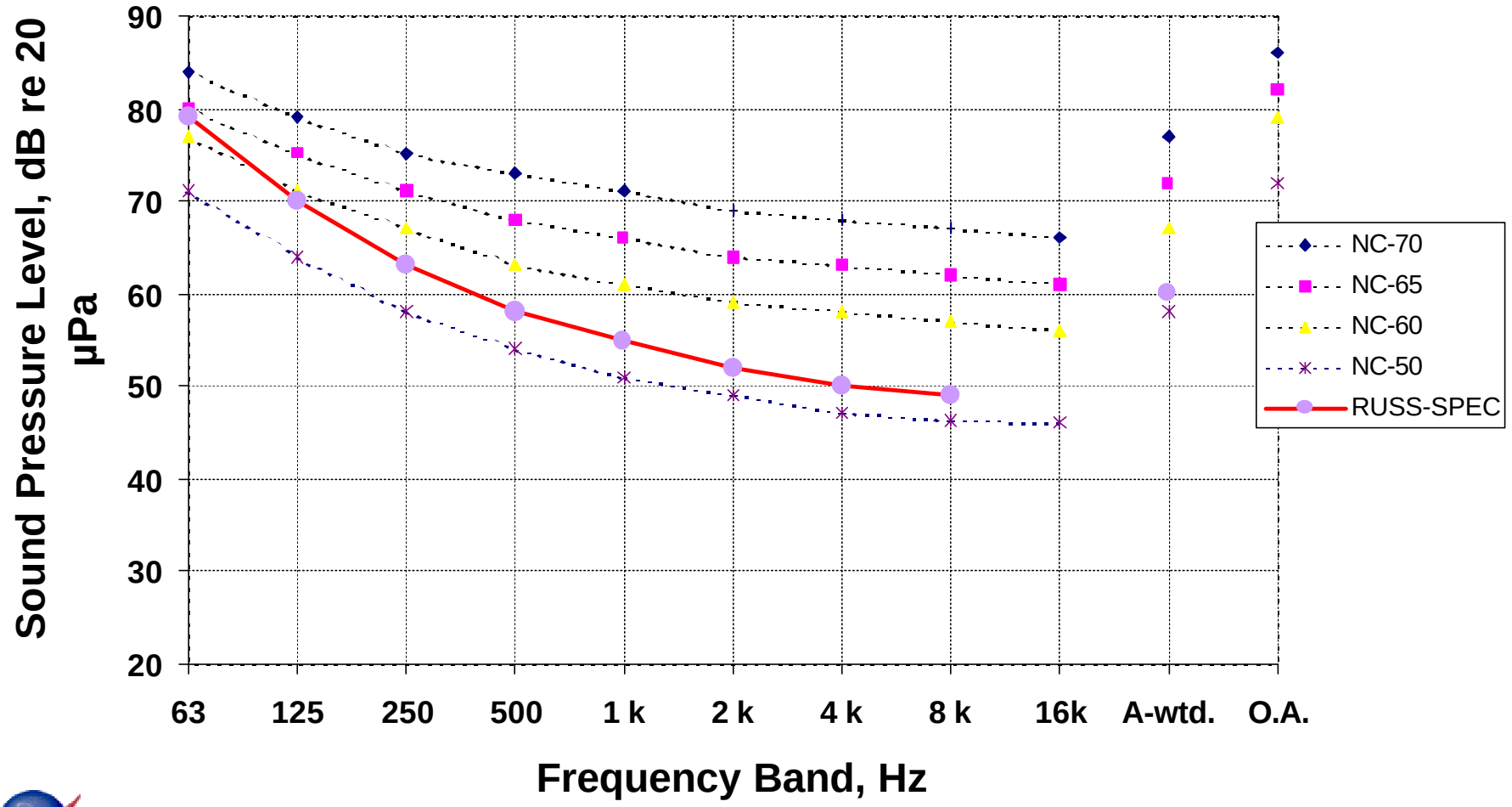
- **Noise levels significantly exceed specifications/guidelines**
- **Onboard acoustics measurements are being conducted on a regular basis to better define the acoustics environment**

Position	Pre-Launch (dBA)	12/19/00 (dBA)	12/28/00 (dBA)	1/3/01 (dBA)	1/10/01 (dBA)	Average (dBA)
At Panel 204	71.0			73.5	72.5	73.0
At Panel 212-213	69.0	71.0		71.0	71.5	71.2
At Junction to Transfer Compartment	70.5			69.0	69.0	69.0
At Vozdukh	74.0	80.0	77.0	77.0	77.0	77.8
Crew Quarters	66.0		63.0	65.5	66.0	64.8
Panel 247	77.5			74.0	74.0	74.0
SM Background Noise	72.5					

International Space Station Program Office
System/Segment Integration
Michael Engle 281-244-0904

Acoustics Requirement

Noise Criteria



International Space Station Program Office
System/Segment Integration
Michael Engle 281-244-0904

Non-SM Acoustics Environment

- **FGB**
  - **FGB noise levels in sleeping area range from 63.1 to 66.4 dB (Crewmember Gidzenko is sleeping in the FGB)**
  - **An accurate determination of the FGB baseline noise level is difficult due to the presence of stowed bags along the length of the module.**
- **Node 1**
  - **Node 1 exceeds NC-50 requirements only at 500 Hz (< 5 dB over the NC-50 limit) and 1000 Hz (< 3 dB over the NC-50 limit).**
- **U. S. Laboratory**
  - **U.S. Lab acoustic environment has been measured to be ~ NC-55 (vs. NASA requirement of NC-50).**

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Acoustics Plan

2) ISS crew will still be required to wear hearing protection measures

- **Protective H/W will be ready for Increment 2**
- **Time crew required to wear protective H/W is reduced from Increment 1**
  - Increment 1 estimates were 11-14 hours a day (Crew actually wore equipment ~ 10 hours a day)
- **Time for Increment 2 crew is reduced because of time spent in Lab/Node**
- **Audiometer tests conducted on the EXP 1 crew showed no shift in audible frequencies**
  - Some shift at very high inaudible range
  - Test conditions not optimal

3) ISS provides "safe haven" for ISS crew for 8 - 10 hours per day for ear rest.

- **The 2 SM sleep stations are habitable (~ 63-66 dBA)**
- **3rd crewmember will sleep in the LAB**

4) Noise reduction measures planned

To date, no acoustics countermeasures have been implemented onboard SM. Some countermeasures have been built, and their status is follows:

- **Soundproofing cover for the Vozdukh (manifested on Progress 4)**
- **Noise absorbing mats for interior panels (manifested on Progress 4)**
- **Vibration absorbers for the COTP fans (not yet tested)**
- **Acoustic wrapping for the CKB (not yet tested)**

The remainder of the countermeasures (mufflers and noise absorbing mats) listed in the original "SM Quieting Plan", agreed to as part of the Expedition 1 crew CoFR, are in various stages of development, fabrication, or testing.

Michael Engle 281-244-0904

Acoustics Plan

5) The team doesn't expect the near term modifications to meet the SM requirement.

Quiet fans will be required to meet the requirement

Original agreement was for delivery in '02

6) ISSP needs to reach agreement with RSA on firm date for meeting SM acoustics requirements

Updated agreement planned for JPR in 4/01

Michael Engle 281-244-0904

Conclusion

- **Acoustics Environment for Increment 2 not a constraint to launch**
- **Continuing to emphasize acoustics countermeasures to bring ISS closer to compliance**
  - **RSA commitment on SM countermeasures planned for JPR**

Michael Engle 281-244-0904

5A.1 Flight Readiness Review (FRR)

CSA & Robotics Integration Office

CSA & Robotics Integration Office

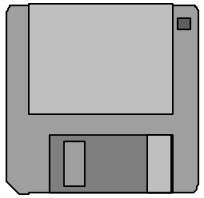
February 27, 2001

C. Hatfield
281-244-7766

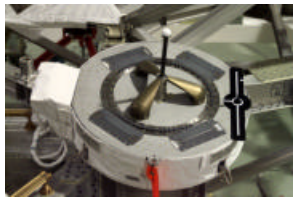
ISS-D-10

Robotics Initial Operations Capability

5A



Software



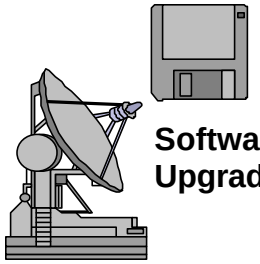
PDGF

VSC

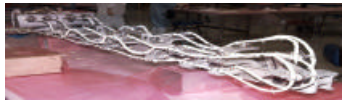
5A.1

RWS (GFE)

AVU (GFE)



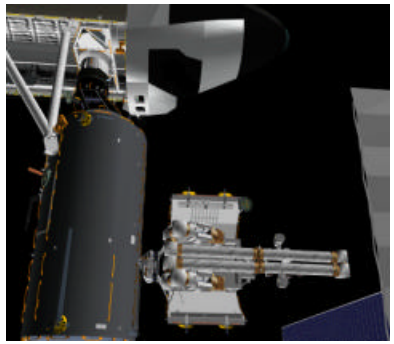
Software Upgrades (CSA)



Rigid Umbilical (Boeing)

LCA (Boeing)

6A



SSRMS

5A.1 is a major step in achieving initial station-based robotics capability

C. Hatfield / OM7 / 281-244-7766

5A.1
Robotics Initial Operations Capability

The RWS is an interface between the on-orbit crew and the MSS

- **The RWS is certified for Flight on 5A.1**
- **All issues closed**
- **READY FOR FLIGHT**

Robotics Work Station (RWS)

C. Hatfield / OM7 / 281-244-7766

5A.1
Robotics Initial Operations Capability

Robotic On-Orbit Trainer (ROBOT)

- Maintain on-orbit crew proficiency
- Certified in limited configuration (no hand controllers)
- READY FOR FLIGHT

ROBOT

Robotic Situational Awareness Display (RSAD

- Crew aid for situational awareness
- READY FOR FLIGHT

RSAD

Artificial Vision Unit (AVU)

- Station-based space vision system
- Certified for flight on 5A.1
- No issues
- READY FOR FLIGHT

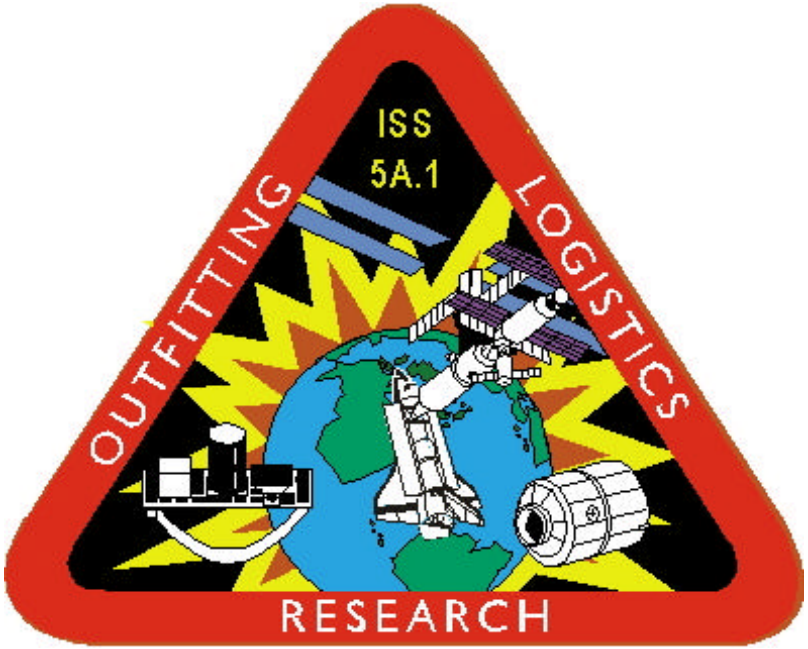
C. Hatfield / OM7 / 281-244-7766

Robotics Initial Operations Capability

- **SUMMARY**
  - **CSA and NASA developed a plan to provide an integrated initial robotics capability, including all elements from Flight 5A through 6A.**
  - **This Plan has been successfully executed.**
  - **During flight operations, an issue was identified with the Utility Outlet Panel (UOP) tripping. The integrated MSS command system (RWS, AVU, Laptops, and associated cables) has been tested for this condition. The RWS has limited susceptibility to this problem and this is not an issue for 5A.1. Any fix identified will be flown on Flight 6A.**
  - **With the completion of the 5A.1 mission, CSA and NASA will have successfully deployed integrated and tested robotics flight control systems and is ready to accept the SSRMS on Flight 6A.**

5A.1 Flight Readiness Review
Avionics & Software

Peggy Thomas
Boeing Avionics and Software
Houston, Texas



New Functionality and Hardware
Avionics and Software – Laptops and GN&C

- **Portable Computer System (PCS)**
  - **Major Hardware items added – 2 laptops and 3 hard drives**
  - **Functionality – none new**
- **Station Support Computer (SSC)**
  - **Major Hardware items added – Expansion chassis for videoconferencing, PCMCIA drives**
  - **Functionality - Ku Band Interface and Ku-Band Video conferencing activated**
- **Guidance Navigation and Control (GN&C)**
  - **Hardware deployed on 5A.1: 2nd SIGI (Global Positioning System) Receiver Processor**
  - **Functionality - None added on 5A.1**

New Functionality and Hardware Avionics and Software – C&T

- S-Band – No change, no hardware
- Ku-Band
  - Hardware –
    - AV Rack 3 - High Rate Modem (HRM), High Rate Frame Multiplexer (HRFM) Video Baseband Signal Processor (VBSP), OCA Router
    - Spares- HRM, HRFM and Transmitter Receiver Controller (TRC)
  - All Ku Functions added on 5A.1: Return and forward data link, Videoconferencing
- Audio
  - Hardware deployed on 5A.1: 1 ACS/UCS Audio Interface Unit (AUAI), 1 Audio Interface Unit (AIU), 2 Portable Microphones, 3 sets of Headsets, Headset control unit and cables
  - Audio Functions added on 5A.1: Replace jumper ties to S-Band and Russians, ISS Audio ability to talk to Orbiter Audio System (ICOM-A, Space-to-Ground and Space-to-Space)
- Video
  - Hardware on 5A.1: 2 Video Tape Recorders (VTR) , 2 Common Video Interface Unit (CVIU), 3 GFE ISS Camcorders
  - Functions added on 5A.1: Connected to Ku Band – downlink

New Functionality and Hardware Avionics and Software - C&DH

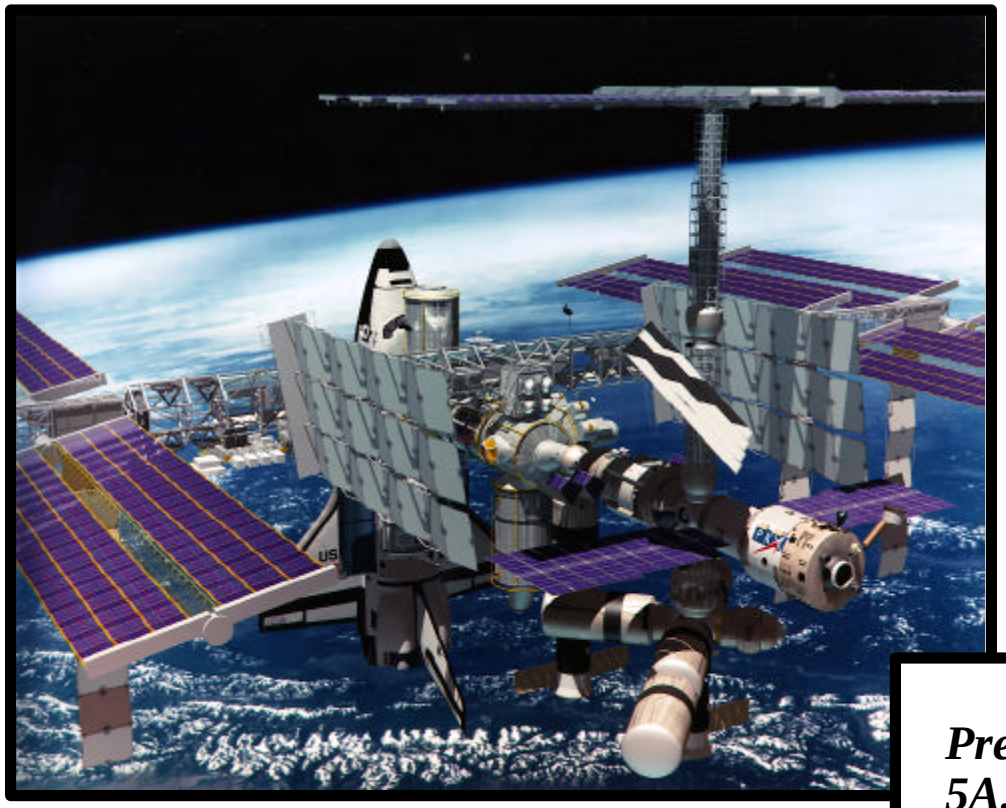
- **Command and Data Handling (C&DH) Hardware**
  - **Hardware deployed on 5A: 2nd of 2 Payload Executive Processor (PEP), 1 Payload Ethernet Hub Gateway (PEHG), 1 Medium Rate Communication Outage Recorder (MCOR)**
  - **Functional Evolution of C&DH Hardware on 5A.1**
    - **Add MCOR and second PEP, and Power up 3rd Command and Control Multiplexer- Demultipelxer (MDM) (up on 5A)**
- **Software**
  - **New Computer Software Configuration Item (CSCI) : MPLM Software**
    - **Orbiter Interface – as Remote Terminal on MIL STD 1553B Bus**
    - **ISS interface - Tier 3 MDM under Internal Systems (INTSYS)**
    - **Passive on 5A.1 (no Refrigerator/Freezers)**
  - **Pre-Positioned Loads (PPL's) in Integrated Flight Load (IFL) 5A.1 2.2 - ECD 3/1/01**

Open Paper

- **Waivers/Deviations**
  - **No new waivers of deviations for Avionics and Software for 5A.1**

- **PCS/SSC Hardware, C&T, GN&C, C&DH Hardware**
  - **No open paper**

- **Software**
  - **19 system/segment VCNs open**
    - **12 VCNs - dependent on rebaselining VLNs to move Payload and MSS caution and warning tests to 6A - ECD 2/27/01**
    - **1 VCN tied to telemetry portion of Command and Telemetry cert Report to MOD - ECD 2/23/01.**
    - **6 VCNs tied to letter from Canadian Space Agency certifying MSS segment requirements verification**
  - **Software PR's open – no constraint to flight**
    - **1 Created**
    - **18 Analysis Required**
    - **8 Analysis Supplied**
    - **9 SPN's in approval cycle**

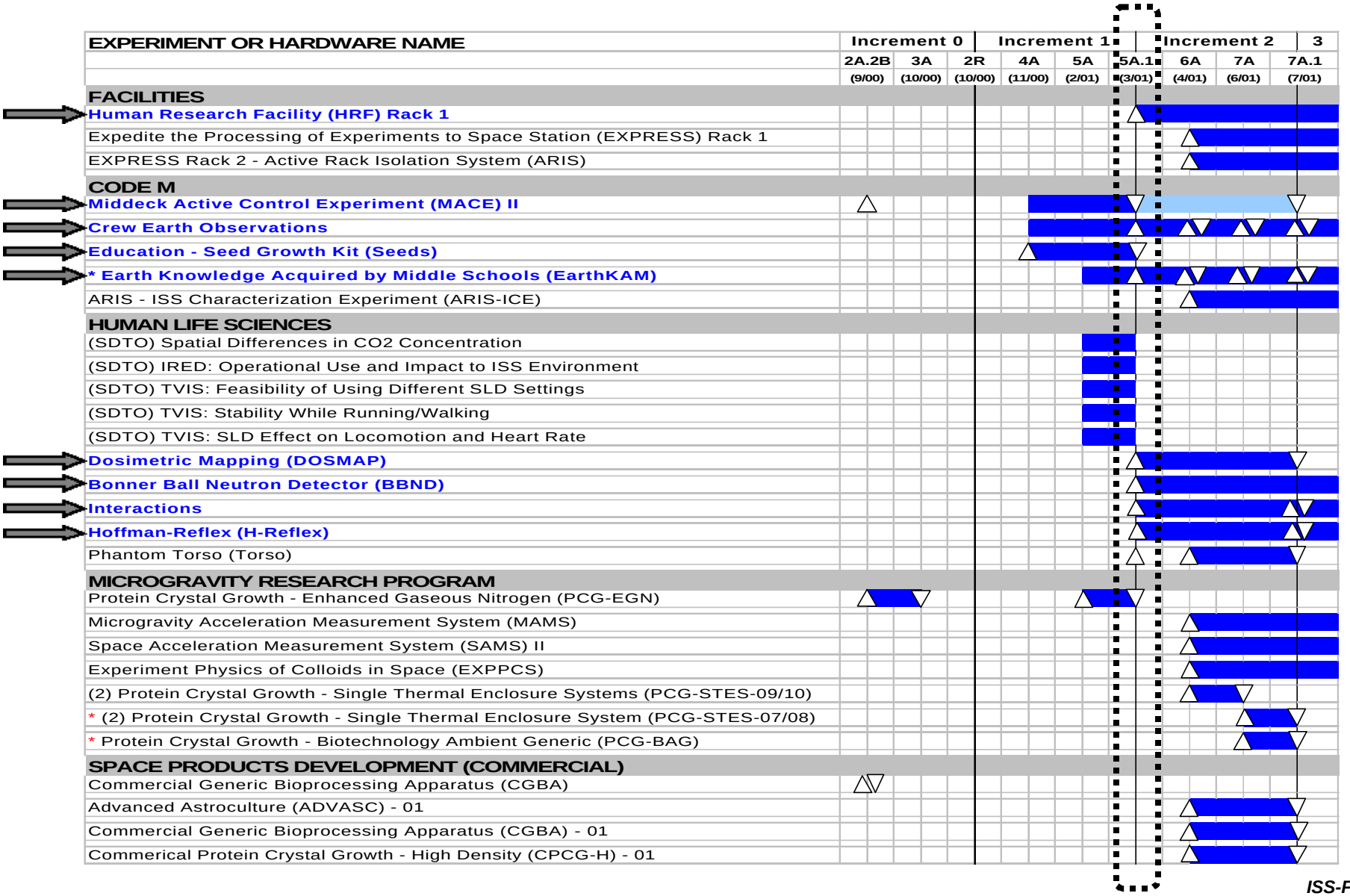


ISS 5A.1 (STS-102)

Presentation to:
5A.1 Flight Readiness Review

Richard Nygren, Manager
Space Station Payloads Office
February 27, 2001

STS-102/5A.1 ISS Research Overview

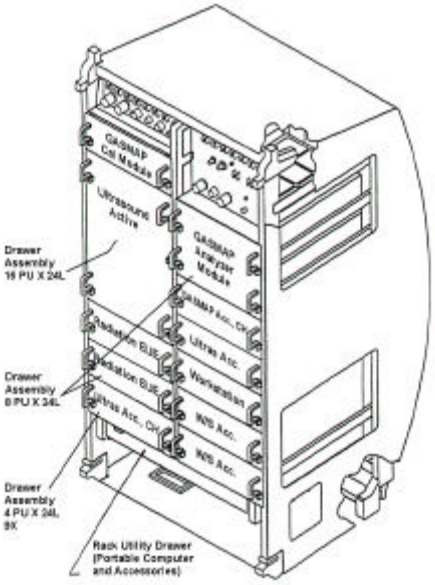


EXPERIMENT OR HARDWARE NAME	Increment 0			Increment 1			Increment 2			3
	2A.2B (9/00)	3A (10/00)	2R (10/00)	4A (11/00)	5A (2/01)	5A.1 (3/01)	6A (4/01)	7A (6/01)	7A.1 (7/01)	
FACILITIES										
Human Research Facility (HRF) Rack 1										
Expedite the Processing of Experiments to Space Station (EXPRESS) Rack 1										
EXPRESS Rack 2 - Active Rack Isolation System (ARIS)										
CODE M										
Middeck Active Control Experiment (MACE) II										
Crew Earth Observations										
Education - Seed Growth Kit (Seeds)										
* Earth Knowledge Acquired by Middle Schools (EarthKAM)										
ARIS - ISS Characterization Experiment (ARIS-ICE)										
HUMAN LIFE SCIENCES										
(SDTO) Spatial Differences in CO2 Concentration										
(SDTO) IRED: Operational Use and Impact to ISS Environment										
(SDTO) TVIS: Feasibility of Using Different SLD Settings										
(SDTO) TVIS: Stability While Running/Walking										
(SDTO) TVIS: SLD Effect on Locomotion and Heart Rate										
Dosimetric Mapping (DOSMAP)										
Bonner Ball Neutron Detector (BBND)										
Interactions										
Hoffman-Reflex (H-Reflex)										
Phantom Torso (Torso)										
MICROGRAVITY RESEARCH PROGRAM										
Protein Crystal Growth - Enhanced Gaseous Nitrogen (PCG-EGN)										
Microgravity Acceleration Measurement System (MAMS)										
Space Acceleration Measurement System (SAMS) II										
Experiment Physics of Colloids in Space (EXPPCS)										
(2) Protein Crystal Growth - Single Thermal Enclosure Systems (PCG-STES-09/10)										
* (2) Protein Crystal Growth - Single Thermal Enclosure System (PCG-STES-07/08)										
* Protein Crystal Growth - Biotechnology Ambient Generic (PCG-BAG)										
SPACE PRODUCTS DEVELOPMENT (COMMERCIAL)										
Commercial Generic Bioprocessing Apparatus (CGBA)										
Advanced Astroculture (ADVASC) - 01										
Commercial Generic Bioprocessing Apparatus (CGBA) - 01										
Commerical Protein Crystal Growth - High Density (CPCG-H) - 01										

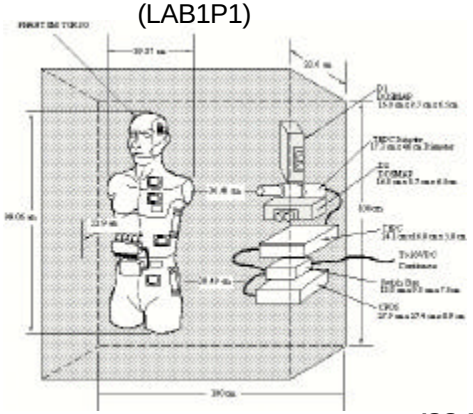
5A.1 Flight and Stage Objectives

- **Joint Operations**
  - H-Reflex data collection on FD2 and FD7
  - Education – Seed Growth Kit (EDU-SGK) watering, electronic still photography and return
  - Protein Crystal Growth – Enhanced Gaseous Nitrogren (PCG-EGN) return
- **Transfer, installation and activation of Human Research Facility (HRF) Rack-1 and Radiation Suite**
  - Dosimetric Mapping (DOSMAP)
  - Bonner Ball Neutron Detector (BBND)
  - Interactions
  - Hoffman-Reflex (H-Reflex)
  - Phantom Torso – setup only
- **Continuing payload operations**
  - Crew Earth Observations (CEO)
  - Earth Knowledge Acquired by Middle Schools (EarthKAM)
  - Middeck Active Control Experiment II (MACE II) - CR in process to extend operations

Human Research Facility
(LAB1S2)



HRF Radiation Suite
(LAB1P1)



HRF Overview and SSPCM Exception

- **First facility-class payload, Human Research facility ready for launch, installation and activation**
  - HRF will enable life science researchers to study physiological, behavioral and chemical changes in human beings during space flight.
  - Rack installed in MPLM (11/30/00); 6.25 CTBE MPLM passive stowage; 0.83 MLE middeck passive stowage
- **Solid State Power Control Module (SSPCM)**
  - Electrical short discovered between 120 VRTN and Chassis Ground in EXPRESS Rack 5 – failed isolation check. Troubleshooting revealed EMI/EMC filter choke return winding was shorted to internal relay housing.
  - Inspected 10 production units at manufacturer, EXPRESS Racks 1 and 2 prior to MPLM installation, “fielded” units in EXPRESS Rack 5 and Functional Checkout Unit – no similar condition.
  - HRF installed in MPLM and not accessible for SSPCM testing.
    - » Passed isolation tests at MSFC.
    - » PSPICE analysis shows this condition causes no hazard to crew or equipment (shock, thermal, EMI).
    - » If occurs, analysis shows no degradation of SSPCM or associated rack equipment.
  - Presented analysis to EME Control Board and received concurrence to fly as is.
  - Presented analysis to Daily Space Station Review and received concurrence to fly with on-orbit isolation check.
  - Crew procedures to be changed to add isolation measurements.
    - » If condition present, nominal rack operations permitted and non-conformance will be tracked in the EMI/EMC database.

HRF Time Constant Waiver

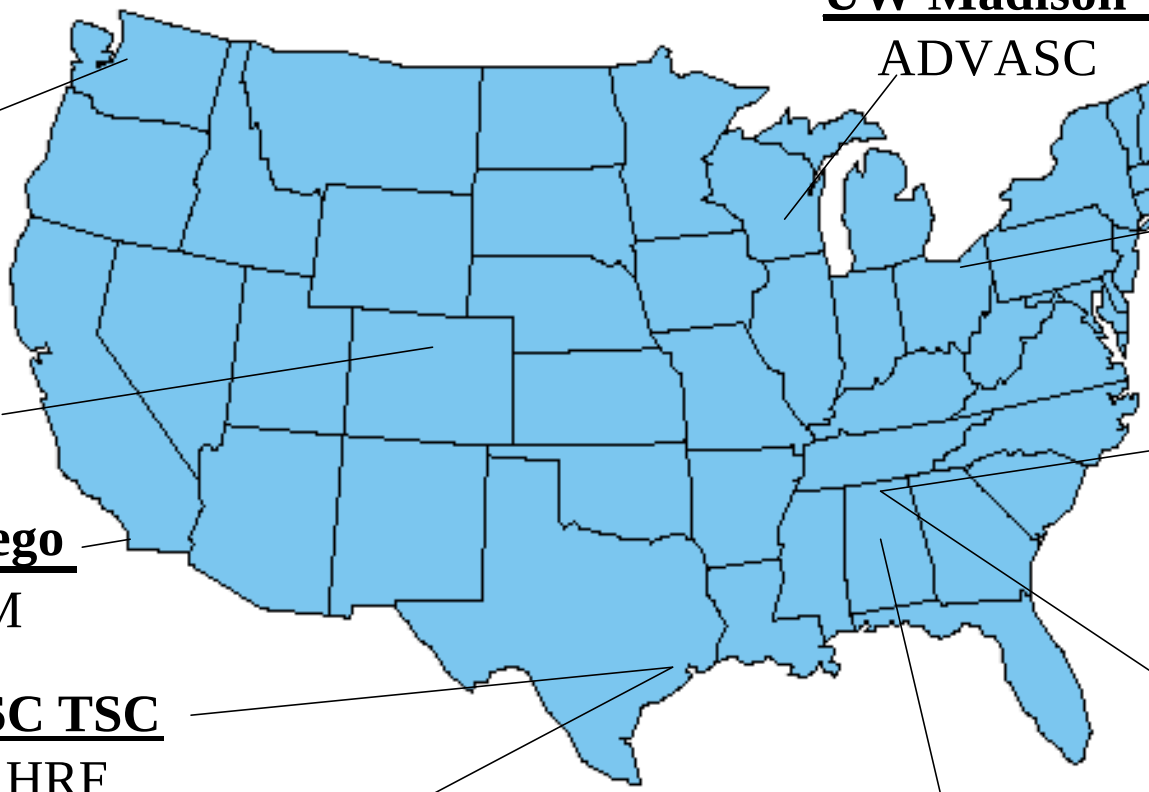
(PIRN 57200-NA-0025)

- **Actuation of HRF automatic valve controllers could interact with US Lab Rack Flow Control Assemblies (RFCA).**
- **This results in flow rate and pressure differential oscillations between Internal Thermal Control System and HRF rack during rack activation and loop transitions. Possible vehicle alarm for low dP in Lab System Flow Control Assembly.**
- **Solutions**
  - Software modifications reduced activation flow spike from 80 seconds to 2 seconds
  - Inhibit closed-loop control of the Lab RFCA when payload valves are controlling flow
  - Use RFCA to limit magnitude of flow rate surge
- **Concurrence with ISS Vehicle, ISS Payloads, Boeing and NASA TCS, HRF, EXPRESS, MOD, POIC and Boeing S&MA.**
- **Recommended procedures were tested in the Payload Rack Checkout Unit with the HRF Flight Prototype Unit.**
- **Changes to payload and crew procedures are in work.**
  - Will note in procedure “Expect possible caution ‘Lab MTL SFCA Uncontrolled DP-LAB”

Payload Operations Integration Status

- **MSFC POIC core functions are in place. Incomplete capabilities have operations workarounds; work continues to install capabilities for follow-on flights.**
  - 8 hours/day x 5 days/week operations began 2/5/01; 16 x 5 began 2/22/01
  - Continuous staffing begins one week before 5A.1 launch (3/1/01)
- **5 Payload Operations Integration Center (POIC) control teams certified for flight**
  - Participating in POIC Cadre Only, Cadre/Payload Developer and Joint Multi-Segment simulations
- **Supporting facilities coming online**
  - 5A.1
    - » JSC Telescience Support Center (TSC)
    - » University of California – San Diego
  - 6A
    - » MSFC and GRC TSCs
    - » MSFC US Operation Center
    - » Boeing-Houston & Boeing-Seattle
    - » Harvard University, University of Colorado-Boulder, University of Wisconsin and University of Alabama-Birmingham
- **Expedition 2 ground training complete with a total of 116.25 hours**
  - Additional operational risk accepted due to reduction of payload training hours
  - Potential 30 minute Middeck Active Control Experiment II (MACE II) safety briefing if operations extended to Increment 2

Increment 2 Remote Sites



Boeing
ARIS-ICE

UW Madison
ADVASC

Harvard
EXPPCS

GRC TSC
SAMS-II, EXPPCS, MAMS

UC Boulder
CGBA

MSFC TSC
PCG-STES, PCG-BAG

UC San Diego
EarthKAM

JSC TSC
HRF
ARIS-ICE

Boeing
PEI

UAB*
CPCG-H

USOC
EXPRESS
ARIS-ICE

Summary

- Flight objectives and priorities are defined
- Flight manifest has been defined
- All hardware and software certification is completed or planned to be complete before L-2
- Personnel and facilities are ready to support
- Hardware delivery and processing schedule support launch date
- US and Russian certification schedule support launch date
- Special topics have been resolved or have acceptable operational workarounds

The ISS Program is Ready to Proceed to the Launch of ISS 5A.1/STS-102

NASA JSC PREDICTIONS: MIR SPACE STATION DECAY PROFILE

(Generated: 02/26/01, MSFC Jan-2001Atmosphere, IC: USSP057 SV, TOPO/S. D. Paul)

CURRENT MIR CONDITIONS: 02/26/01 12:14 GMT, Ha x Hp: 282.7 x 254.4 km, Have: 268.6 km